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Date:
2 February 2016

Project No.:
GP14DRUM.RCSC

Subject:
IRP 1795 Construction Completion Report Addendum
Activation of Air Sparging Systems at Area 1795

This memorandum documents the activation of the air sparge (AS) systems at Area 1795 following the review of monitoring data indicating that the application of AS would increase the aggressiveness of the remediation and aid in achieving closure in a shorter time period. Both AS blowers were activated on September 30, 2015 and air was injected into the saturated zone in select existing air sparge wells. In order to achieve adequate coverage with the air sparge technology, 12 additional air sparge wells were installed between November 4 and November 11. All 12 of the new wells were subsequently connected to the system and activated on December 17, 2015. A layout of the system indicating the wells which are currently operational is included as Figure 1.

Air Sparge Well Installation

In November 2015, 12 new AS wells (AS-1 through AS-12) were installed to supplement the existing AS well network. Air sparge wells AS-1 through AS-9 were installed to an approximate depth of 26 feet with a screen interval from 24 to 26 feet below grade. Air sparge wells AS-10 through AS-12 were installed to an approximate depth of 31 feet with a screen interval from 29 to 31 feet below grade. Each AS well was constructed with 2-inch diameter SCH 40 PVC with a two-foot length of 0.010-inch slot screen. Well sampling, construction, and development logs are provided in Appendix A.

Process Piping and Wellhead Construction Upgrades

Upgrades were made to the above-grade piping network located in the system building and piping enclosure which houses portions of the piping manifolds and headers prior to running below grade. The existing AS process piping was inspected and tested. The existing Pitot tube devices were re-installed using SCH 80 PVC threaded saddle fittings. The AS manifold was connected to the existing below grade headers utilizing pressure rated hose.

Existing AS wells that were not used to connect to new AS wells were not modified. The new AS wells were connected to the existing AS headers utilizing nearby adjacent AS wells by installing galvanized threaded nipple/barb fittings to allow connection of a 1-inch diameter pressure rated hose, which was connected above grade between the existing AS well and the new AS well. The hose was installed within a 2-inch diameter PVC pipe sleeve for added protection. The new AS wells were connected using the hose installed to a steel tee fitting above grade with the riser transitioning to PVC approximately 2 feet below grade. Wellhead construction details for the bioventing and AS wells are presented on Figure 2.

System Operational Parameters

Each of the AS blowers were started slowly to allow for monitoring of the process equipment (e.g., blower belts, heat exchanger, piping, and gauges) for safe operation. The system operational parameters for Trailer A and Trailer B AS systems are included in Tables 1 and 2, respectively. A piping and instrumentation diagram for both AS system is included in Figure 3.

Enclosures:

Figures 1, 2, and 3
Tables 1 and 2
Appendix A – Well Logs

Figures

WATER TREATMENT SYSTEM
REMEDIAL SYSTEM B
MANIFOLD SHED
CONCRETE PAD
REMEDIAL SYSTEM A
MWS11
MWS14
MWS15
MWS5
MWS6
MWS7
MW6
MW36
MW37
MW38
PZ1
PZ2
PZ3
PZ4
PZ5
PZ6
PZ7
PZ8
PZ9
PZ10
PZ11
PZ12
PZ13
PZ14
PZ15
PZ16
PZ17
PZ18
RW1
RW2
RW3
AS-01
AS-02
AS-03
AS-04
AS-05
AS-06
AS-07
AS-08
AS-09
AS-10
AS-11
AS-12
ONEIDA AVE
ONTARIO AVE
SEVENTH ST WEST
SEVENTH ST

LEGEND

- MONITORING WELL
- AIR SPARGE WELL
- OZONE INJECTION POINT
- PIEZOMETER
- RECOVERY WELL
- SOIL VAPOR EXTRACTION WELL
- HORIZONTAL SOIL VAPOR EXTRACTION WELL
- AS WELL (ONLINE)
- BIOVENT WELL (ONLINE)
- ABOVE-GRADE BIOVENT AIR SUPPLY LINE
- ABOVE-GRADE AIR SPARGE LINE
- BIOVENT AIR SUPPLY LINE
- AIR SPARGE LINE
- TREATED EFFLUENT WATER LINE
- PAVED ROAD
- REMEDIATION SYSTEM
- NEW AIR SPARGE WELL

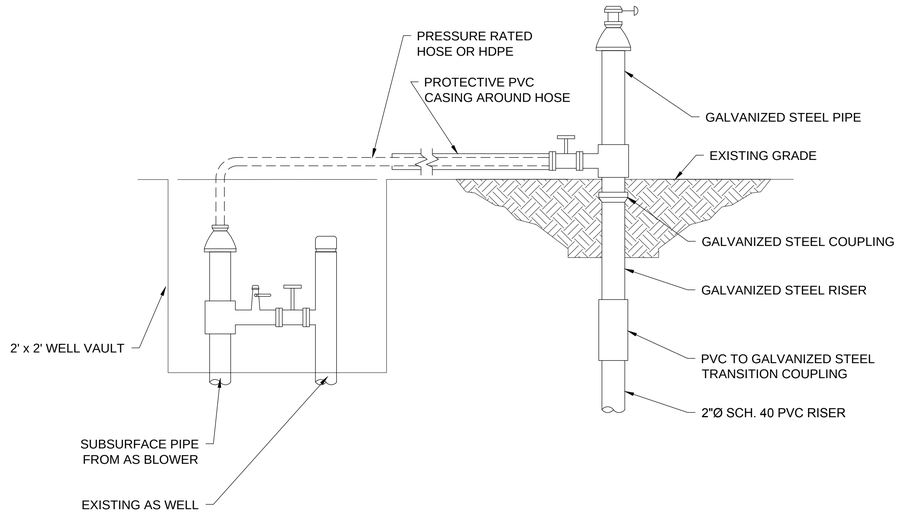
0 80 160
GRAPHIC SCALE

FORT DRUM
FORT DRUM, NEW YORK
IRP CCR

1795 AREA BIOVENTING SYSTEM OPERATIONAL LAYOUT

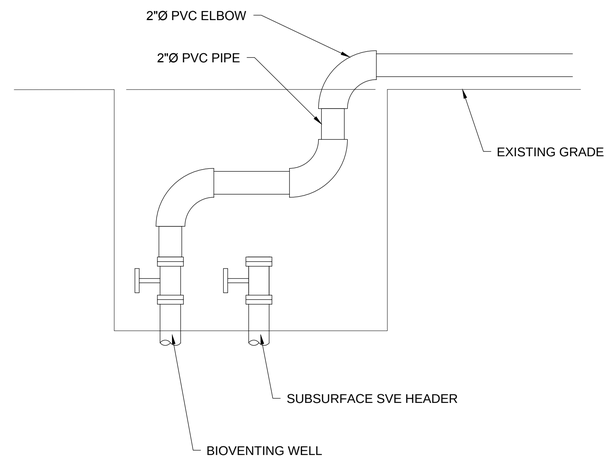
PIKA INTERNATIONAL, INC. — A JOINT VENTURE — MALCOLM PIRNIE

FIGURE
1



WELLHEAD DETAIL FOR NEW AIR SPARGE WELLS

NOT TO SCALE



WELLHEAD DETAIL FOR BIOVENTING

NOT TO SCALE

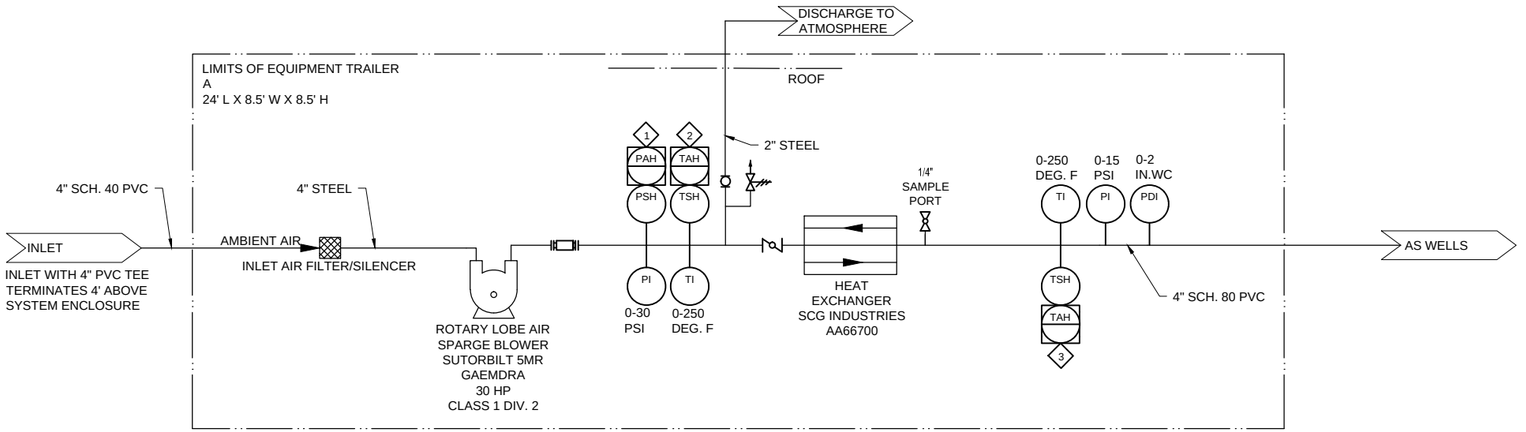
FORT DRUM
FORT DRUM NEW YORK

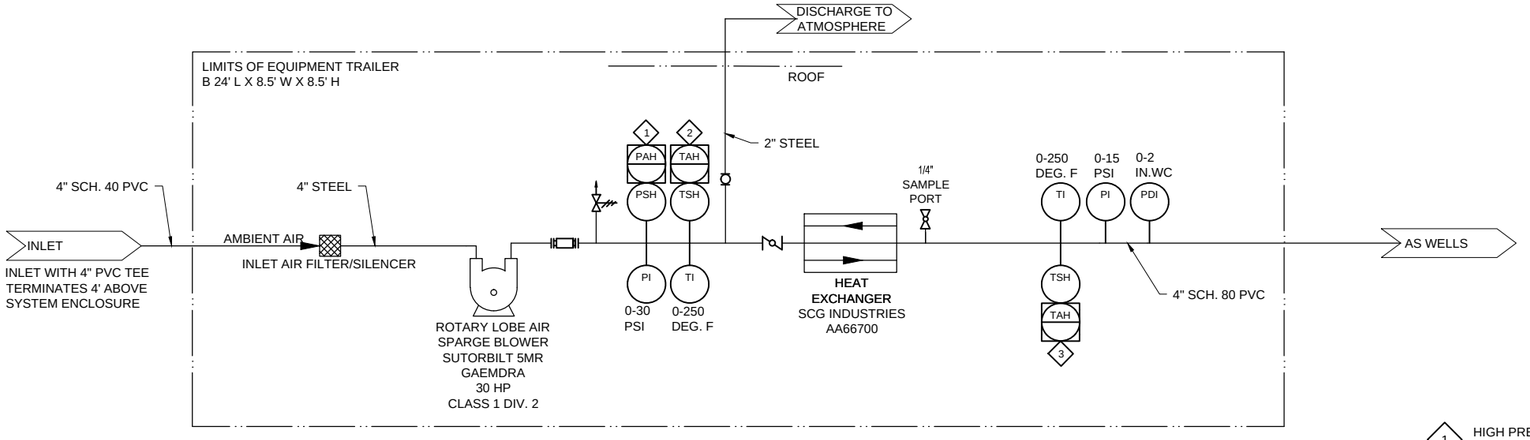
IRP QUARTERLY REPORT

1795 AREA
WELLHEAD CONSTRUCTION DETAILS

PIKA INTERNATIONAL, INC. A JOINT VENTURE — MALCOLM PIRNIE

2





1 HIGH PRESSURE ALARM, SYSTEM SHUTDOWN

2 HIGH TEMPERATURE ALARM, SYSTEM SHUTDOWN

3 HIGH TEMPERATURE ALARM, SYSTEM SHUTDOWN

0 1' 2'
GRAPHIC SCALE

FORT DRUM
FORT DRUM NEW YORK

IRP QUARTERLY REPORT

1795 AREA BIOVENTING/AIR SPARGE SYSTEM OPERATIONAL LAYOUT

PIKA INTERNATIONAL, INC. A JOINT VENTURE — MALCOLM PIRNIE

3

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(On|Off=*OFF*=REF*
I:\ENVCAD\WhitePlains-NY\ACTIVE\26103100000002\PIDs\IRP CCR\PID_Air Sparge for area 1795A - Existing.dwg LAYOUT: 3 SAVED: 1/19/2016 8:18 AM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTCONT.CTB PLOTTED: 1/19/2016 3:24 PM BY: IAMICELI, KIMBERLY
XREFS: IMAGES: PROJECTNAME: ---
06261031X00 PIKA MP Logo.jpg

Tables

Table 1
Fort Drum IRP
1795 Trailer A Air Sparge System Data

Date	Time	Operational Upon Arrival?	Blower Runtime (hrs)	Heat Exchanger Inlet Temperature (F)	Heat Exchanger Inlet Pressure (in. w.c.)	Heat Exchanger Outlet Temperature (F)	Heat Exchanger Outlet Pressure (in. w.c.)	Differential Pressure (in. w.c)	Pre-Inlet Filter Vacuum (in. w.c.)	Post-Filter Inlet Vacuum (in. w.c.)	Bleed Air Percent Open (%)	Operational Comments
9/30/2015	NM	NO	NM	NM	NM	NM	NM	NM	NM	NM	NM	Air sparge system startup
10/1/2015	8:34 AM	YES	43,351.6	136	10	75	9	NM	4	NM	0	
10/2/2015	10:53 AM	YES	43,351.6	142	9	82	9	NM	6	NM	0	
10/5/2015	11:49 AM	YES	43,351.6	154	8	89	7.5	NM	10	NM	0	
10/6/2015	8:51 AM	YES	43,351.6	151	8.5	86	8	NM	4	NM	0	
10/7/2015	9:44 AM	YES	43,351.6	152	8	88	7.5	NM	5	NM	0	
10/8/2015	9:42 AM	YES	43,351.6	143	9	80	8.5	NM	4	NM	0	
10/12/2015	8:39 AM	YES	43,351.6	158	8	93	7.5	NM	2	NM	0	
10/13/2015	9:57 AM	YES	43,351.6	153	8	88	7.5	NM	2	NM	0	
10/14/2015	1:51 PM	YES	43,351.6	147	8	86	7.5	NM	2	NM	0	
10/15/2015	10:12 AM	YES	43,351.6	149	8.5	88	7.5	NM	2	NM	0	
10/16/2015	9:02 AM	YES	43,351.6	138	9	78	8.5	NM	2	NM	0	
10/19/2015	9:23 AM	YES	43,351.6	123	10.5	66	9.25	NM	2	NM	0	
10/20/2015	12:13 PM	YES	43,351.6	151	8	90	7.5	NM	2	NM	0	
10/21/2015	9:50 AM	YES	43,351.6	137	9	76	8.5	NM	2	NM	0	
10/22/2015	9:37 AM	YES	43,351.6	156	8	94	7.5	NM	2	NM	0	
10/23/2015	8:47 AM	YES	43,351.6	127	10	70	9	NM	2	NM	0	
10/26/2015	10:48 AM	YES	43,351.6	131	10	95	8.5	NM	2	NM	0	
10/27/2015	10:18 AM	NO	43,351.6	OFF	OFF	OFF	OFF	OFF	OFF	NM	OFF	Cycling
10/28/2015	12:32 PM	NO	43,351.6	OFF	OFF	OFF	OFF	OFF	OFF	NM	OFF	Cycling
10/29/2015	3:16 PM	YES	43,351.6	161	10	86	9	NM	2	NM	0	
10/30/2015	10:41 AM	NO	43,351.6	OFF	OFF	OFF	OFF	OFF	OFF	NM	OFF	Cycling
11/2/2015	8:54 AM	NO	43,351.6	OFF	OFF	OFF	OFF	OFF	OFF	NM	OFF	Cycling
11/03/2015	9:53 A.M.	NO	43,351.6	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Cycling.
11/03/2015	9:53 A.M.	NO	43,351.6	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Cycling.
11/04/2015	9:16 A.M.	YES	43,351.6	169	11.5	81	10.5	NM	2	NM	0	
11/05/2015	9:06 A.M.	NO	43,351.6	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Down for new well installation.
11/06/2015	8:31 A.M.	NO	43,351.6	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Down for new well installation.
11/09/2015	10:46 A.M.	NO	43,351.6	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Down for new well installation.

Table 1
Fort Drum IRP
1795 Trailer A Air Sparge System Data

Date	Time	Operational Upon Arrival?	Blower Runtime (hrs)	Heat Exchanger Inlet Temperature (F)	Heat Exchanger Inlet Pressure (in. w.c.)	Heat Exchanger Outlet Temperature (F)	Heat Exchanger Outlet Pressure (in. w.c.)	Differential Pressure (in. w.c)	Pre-Inlet Filter Vacuum (in. w.c.)	Post-Filter Inlet Vacuum (in. w.c.)	Bleed Air Percent Open (%)	Operational Comments
11/10/2015	8:29 A.M.	NO	43,351.6	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Down for new well installation.
11/11/2015	9:48 A.M.	NO	43,351.6	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Shut down for new well installation.
11/12/2015	8:50 A.M.	NO	43,351.6	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Down for new well installation.
11/13/2015	9:50 A.M.	NO	43,351.6	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Cycling.
11/16/2015	10:42 A.M.	YES	43,351.6	156	10	86	9	NM	2	2	0	
11/16/2015	11:39 A.M.	YES	43,351.6	158	8.5	77	8.5	1	3	2	0	
11/17/2015	10:13 A.M.	YES	43,352.2	145	11.5	73	10	NM	2	2	0	
11/18/2015	2:46 P.M.	YES	43,352.2	162	10	88	9	NM	2	2	0	
11/19/2015	8:37 A.M.	NO	43,352.2	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Cycling.
11/20/2015	9:40 A.M.	YES	43,352.2	160	11.5	80	10.5	NM	2	2	0	
11/23/2015	8:46 A.M.	NO	43,352.2	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Cycling.
11/30/2015	10:13 A.M.	YES	43,352.2	136	11	69	10	NM	2	NM	0	
12/01/2015	9:18 A.M.	YES	43,352.2	156	11.5	78	11	NM	2	NM	0	Drained condensate from compressor.
12/02/2015	9:14 A.M.	YES	43,352.2	170	11	90	10	NM	2	NM	0	
12/03/2015	9:18 A.M.	YES	43,352.2	161	12	83	11	NM	2	NM	0	
12/04/2015	8:29 A.M.	NO	43,352.2	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Cycling.
12/07/2015	11:21 A.M.	YES	43,352.2	144	10	83	9	NM	2	NM	0	
12/08/2015	9:23 A.M.	YES	43,352.2	157	12	80	11	NM	2	NM	0	
12/09/2015	8:59 A.M.	NO	43,352.2	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Cycling.
12/14/2015	10:43 A.M.	YES	43,352.2	165	9.5	92	8.5	NM	2	NM	0	
12/15/2015	9:45 A.M.	NO	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Shut down for new AS well hookup.
12/16/2015	9:05 A.M.	NO	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Shut down for new AS well hook ups.
12/17/2015	11:39 A.M.	NO	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Was off for new AS hookups just turned it back on.
12/18/2015	8:40 A.M.	NO	43,352.2	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Cycling.
12/21/2015	11:08 A.M.	YES	43,352.2	150	10	84	9	NM	2	2	0	
12/28/2015	10:16 A.M.	YES	43,352.2	125	12.5	62	11	NM	2	2	0	

Table 1
Fort Drum IRP
1795 Trailer A Air Sparge System Data

Date	Time	Operational Upon Arrival?	Blower Runtime (hrs)	Heat Exchanger Inlet Temperature (F)	Heat Exchanger Inlet Pressure (in. w.c.)	Heat Exchanger Outlet Temperature (F)	Heat Exchanger Outlet Pressure (in. w.c.)	Differential Pressure (in. w.c)	Pre-Inlet Filter Vacuum (in. w.c.)	Post-Filter Inlet Vacuum (in. w.c.)	Bleed Air Percent Open (%)	Operational Comments
12/29/2015	1:03 P.M.	YES	43,352.2	127	14	65	13	NM	2	2	0	
12/30/2015	10:25 A.M.	YES	43,352.2	105	15	58	13.5	NM	2	2	10	
01/04/2016	11:04 A.M.	YES	43,352.2	92	16.5	31	15	NM	2	2	10	
01/05/2016	11:51 A.M.	NO	43,352.2	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Cycling.
01/06/2016	9:36 A.M.	YES	43,352.2	133	12.5	60	11.5	0.6	2	2	0	
01/07/2016	9:03 A.M.	YES	43,352.2	102	15	48	6	0.44	2	2	0	
01/08/2016	10:01 A.M.	YES	43,352.2	135	11.5	71	10.5	0.54	2	2	0	
01/11/2016	10:50 A.M.	YES	43,352.2	125	11.5	62	10	0.48	2	2	0	

Table 2
Fort Drum IRP
1795 Trailer B Air Sparge System Data

Date	Time	Operational Upon Arrival?	Blower Runtime (hrs)	Heat Exchanger Inlet Temperature (F)	Heat Exchanger Inlet Pressure (in. w.c.)	Heat Exchanger Outlet Temperature (F)	Heat Exchanger Outlet Pressure (in. w.c.)	Differential Pressure (in. w.c)	Pre-Inlet Filter Vacuum (in. w.c.)	Post-Filter Inlet Vacuum (in. w.c.)	Bleed Air Percent Open (%)	Operational Comments
9/30/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	Air sparge system startup
10/1/2015	8:34 AM	Y	49,136.1	150	8.5	77	10	NM	2	NM	0	
10/2/2015	10:53 AM	Y	49,162.2	151	7.5	82	9	NM	3	NM	0	
10/5/2015	11:49 AM	Y	49,235.2	159	7.5	92	8	NM	2	NM	0	
10/6/2015	8:51 AM	Y	49,256.1	155	7	86	8	NM	4	NM	0	
10/7/2015	9:44 AM	Y	49,281.1	156	7	88	7.5	0.9	4	NM	0	
10/8/2015	9:42 AM	Y	49,305.1	146	7	84	8.5	0.9	4	NM	0	
10/12/2015	8:39 AM	Y	49,399.6	160	6.5	93	7.5	0.75	2	NM	0	
10/13/2015	9:57 AM	Y	49,425.0	154	6	89	7.5	1	2	NM	0	
10/14/2015	1:51 PM	Y	49,452.9	149	6.5	85	8	1	2	NM	0	
10/15/2015	10:12 AM	Y	49,473.7	150	6.5	86	8	1	2	NM	0	
10/16/2015	9:02 AM	Y	49,496.0	140	8.5	79	8.5	1	2	NM	0	
10/19/2015	9:27 AM	Y	49,568.5	125	7.75	65	9	1	2	NM	0	
10/20/2015	12:13 PM	Y	49,595.3	150	6.5	89	7.5	1	NM	NM	0	
10/21/2015	9:50 AM	Y	49,616.9	138	7	78	8.5	1	2	NM	0	
10/22/2015	9:37 AM	Y	49,640.8	155	6	93	7.5	1	2	NM	0	
10/23/2015	8:47 AM	Y	49,363.9	127	7.5	70	9	1	2	NM	0	
10/26/2015	10:43 AM	Y	49,738.2	131	7	74	8.5	1	2	NM	0	
10/27/2015	10:18 AM	N	49,748.3	OFF	OFF	OFF	OFF	OFF	OFF	NM	0	Off for cycling
10/28/2015	12:32 PM	N	49,757.3	OFF	OFF	OFF	OFF	OFF	OFF	NM	0	cycling
10/29/2015	3:16 PM	Y	49,766.2	170	8.5	85	10	1	2	NM	0	
10/30/2015	10:41 AM	N	49,772.3	OFF	OFF	OFF	OFF	OFF	OFF	NM	0	cycling
11/2/2015	8:54 AM	N	49,796.3	OFF	OFF	OFF	OFF	OFF	OFF	NM	0	cycling
11/02/2015	8:54 A.M.	NO	49,796.3	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Cycling.
11/04/2015	9:16 A.M.	YES	49,812.1	179	9	87	11	1	2	NM	0	
11/05/2015	9:06 A.M.	NO	49,812.8	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Down for new well insallation.
11/06/2015	8:31 A.M.	NO	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Down for new well insallation.
11/09/2015	10:46 A.M.	NO	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Down for new well inslallation.
11/10/2015	8:29 A.M.	NO	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Down for new well installation.
11/11/2015	9:48 A.M.	NO	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Shut down for new well installation.
11/12/2015	8:50 A.M.	NO	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Down for new well installation.
11/13/2015	9:50 A.M.	NO	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Cycling.
11/16/2015	10:46 A.M.	YES	49,858.2	163	8	84	10	1	2	2	0	
11/17/2015	10:17 A.M.	YES	49,872.7	148	9	72	10.5	1	2	2	0	
11/18/2015	2:50 P.M.	YES	NM	166	8	86	9	1	2	2	0	
11/19/2015	8:38 A.M.	NO	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Cycling.

Table 2
Fort Drum IRP
1795 Trailer B Air Sparge System Data

Date	Time	Operational Upon Arrival?	Blower Runtime (hrs)	Heat Exchanger Inlet Temperature (F)	Heat Exchanger Inlet Pressure (in. w.c.)	Heat Exchanger Outlet Temperature (F)	Heat Exchanger Outlet Pressure (in. w.c.)	Differential Pressure (in. w.c)	Pre-Inlet Filter Vacuum (in. w.c.)	Post-Filter Inlet Vacuum (in. w.c.)	Bleed Air Percent Open (%)	Operational Comments
11/20/2015	9:45 A.M.	YES	49,917.2	156	8.5	80	10	1	2	2	0	
11/23/2015	8:50 A.M.	YES	49,961.2	119	9.5	63	10	1	2	2	0	
11/30/2015	10:23 A.M.	YES	49,997.9	118	9	62	10	0.5	2	NM	0	
12/01/2015	9:25 A.M.	YES	50,000.3	135	10	70	10.5	0.1	2	NM	0	
12/02/2015	9:41 A.M.	YES	NM	131	10	72	11	1	2	NM	20	Repaired break in air line and restarted system, and cracked open the bleed line on AS system due to press. relief valve being open.
12/03/2015	9:21 A.M.	YES	50,025.7	130	7	73	8.5	1	2	NM	0	
12/04/2015	8:30 A.M.	NO	50,040.3	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Cycling.
12/07/2015	11:27 A.M.	YES	50,087.8	131	7	74	8	1	2	NM	0	
12/08/2015	9:28 A.M.	YES	50,100.8	130	7.5	74	8.5	1	2	NM	0	
12/09/2015	9:01 A.M.	YES	50,115.4	109	7	74	8	1	2	NM	0	
12/14/2015	10:49 A.M.	YES	50,191.4	145	6.5	78	8	1	2	NM	0	
12/15/2015	9:45 A.M.	NO	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Shut down for new AS well hook up.
12/16/2015	9:06 A.M.	NO	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Shut down for new AS well hook ups.
12/17/2015	11:40 A.M.	NO	50,192.0	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Off for new AS hookups just turned them back on.
12/18/2015	8:40 A.M.	NO	50,203.2	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Cycling.
12/21/2015	11:13 A.M.	YES	50,250.4	161	8.5	82	10	1	2	2	0	
12/28/2015	10:21 A.M.	YES	50,354.6	133	9	72	10.5		2	2	0	
12/29/2015	1:09 P.M.	YES	50,370.8	134	8.5	75	9.5	1	2	2	0	
12/30/2015	10:32 A.M.	YES	50,384.7	150	8.5	82	9.5	1	2	2	0	
01/04/2016	11:12 A.M.	YES	50,460.4	109	10	52	11	1	2	2	0	
01/05/2016	11:52 A.M.	NO	50,475.7	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Cycling.
01/06/2016	9:41 A.M.	YES	50,488.9	132	8.75	71	10.5	0.75	2	2	0	
01/07/2016	9:07 A.M.	YES	NM	114	9	65	9.5	1	2	2	0	
01/08/2016	10:05 A.M.	YES	50,519.3	138	8.5	73	10	1	2	2	0	
01/11/2016	10:48 A.M.	YES	50,565.0	136	8.5	78	10	1	2	2	0	

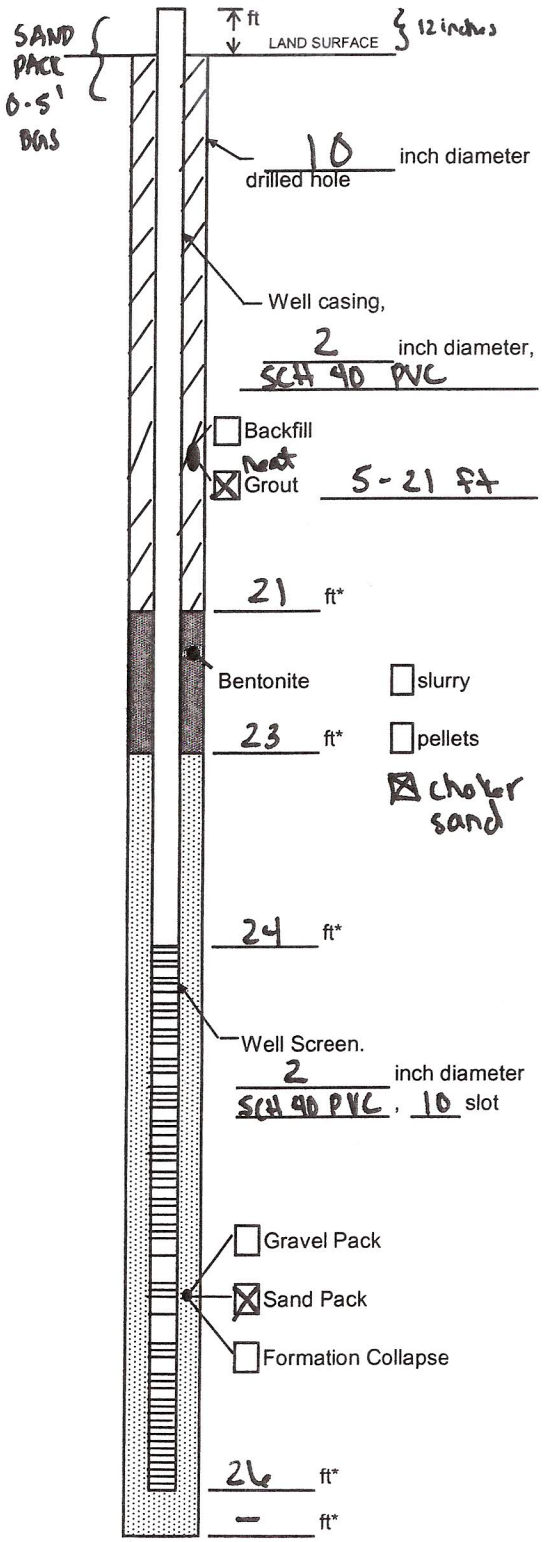
Appendix A

Well Logs

ARCADIS

Well Construction Log

(Unconsolidated)



Measuring Point is Top of Well Casing Unless Otherwise Noted.

* Depth Below Land Surface

Project 1795 AS Wells Well 1795-AS-01

Town/City Watertown (Fort Drum)

County Jefferson State NY

Permit No.

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s)

Drilling Method 6 1/4" HSA

Drilling Contractor Nothnagle Drilling

Drilling Fluid Potable Water

Development Technique(s) and Date(s)

Air lifting 11/12/15

Fluid Loss During Drilling — gallons

Water Removed During Development ~ 34.0 gallons

Static Depth to Water 11.96 feet below M.P.

Static depth to bottom 27.00 feet below MP

Pumping Depth to Water 14.62 feet below M.P.

Pumping Duration 21 ~~hours~~ minutes

Yield _____ gpm Date _____

Specific Capacity _____ gpm/ft

Well Purpose Air sparge

Remarks Final DTB: 27.00 ft BTOC

MP was with ~ 12 inches of PVC above grade

Prepared by Meghan Kiser

ARCADIS

Monitoring Well Development Log

Project/No. Fort Drum IRP 1795 AS Wells Well 1795-AS-01 Date 11/12/15

Total Depth 27.00 ft BTOC

Casing Diameter (inches) 2"

Purge Method

Centrifugal ______

Water Level 11.96 ft BTOC Well Volume (gal) 2.41 gallons

Submersible ______

Water Column 15.04 ft Total Volume Purged ~34.0 gallons

Other: air lifting

Pump On 1505 Pump Off 1526

Developed By Kevin Busch (Nothnagle) Meghan Kiser

Well Casing Volumes

gallon/foot

1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

Time	Minutes Elapsed	Rate (gpm) (mL/min)	DTW (ft)	Gallons Purged	pH	Specific Conductance (mS/cm)	Temp. (C) (F)	Turbidity (NTU)	REMARKS (PID readings, color, odor, etc.)
1515	10	1.53	14.02	15.3	7.53	3.37	13.02	26.3	—
1520	15	2.21	14.04	26.35	7.52	3.61	12.87	9.88	—
1525	20	1.36	14.04	33.15	7.43	3.56	12.75	2.70	—
More than 10 well volumes removed, turbidity less than 50 NTU									
Final DTB:	27.00	ft BTOC							
Final DTW:	12.02	ft BTOC							

ARCADIS

Sample/Core Log

Boring/Well 1795-AS-01 Project/No. GP14 DRUM. RCSC. H1795 Page 1 of 1

Site Location Fort Drum, NY

Drilling Started 11/11/15 Drilling Completed 11/11/15

Total Depth Drilled 26 Feet Hole Diameter 10 inches Type of Sample/ Coring Device 2" SS x 2'

Length and Diameter of Coring Device

Sampling Interval 20 - 26 feet

Land-Surface Elev. feet ☐ Surveyed ☐ Estimated Datum

Drilling Fluid Used Potable water Drilling Method 6 1/4" HSA

Drilling Contractor Nothnagle Driller Kevin Busch Helper Kyle Ryan

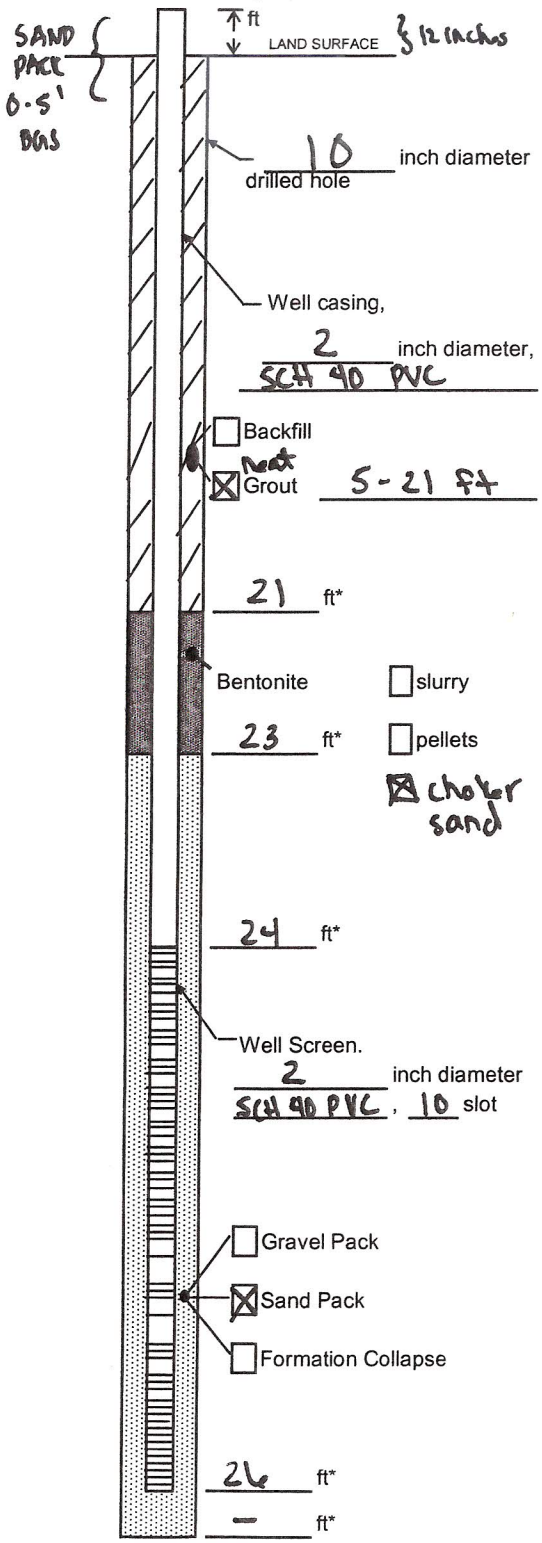
Prepared By Meghan Kiser Hammer Weight 140 Hammer Drop 30 ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	PID Reading (ppm)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
0.0	5.0	NA	NM	NA	hand cleared 0.0 to 5.0 ft
B D					
L R					
I I					
N L					
D L					
20.0	22.0	2.0	0.4 @ 20.0	6-21-33-49	brown, fine to medium sand, wet
			0.9 @ 20.5		(slight odor)
			0.2 @ 21.0		
			0.4 @ 21.5		
22.0	24.0	1.6	0.2 @ 22.0	15-27-38-38	brown, fine to medium sand, wet [22.0 - 22.6 FT BGS]
			0.2 @ 22.5		(slight odor)
			0.2 @ 23.0		gray-brown, fine sand, wet, dense [22.6 - 23.6 FT BGS]
			0.4 @ 23.5		(slight odor)
24.0	26.0	1.7	0.2 @ 24.0	7-15-41-51	gray-brown, fine sand, wet [with black staining @ 25.3 to 25.5 FT BGS]
			0.3 @ 24.5		
			0.3 @ 25.0		(slight odor)
			0.4 @ 25.5		
EOB @	26.0 FT	BGS			SCREENED AT 24.0 TO 26.0 FT BGS

ARCADIS

Well Construction Log

(Unconsolidated)



Measuring Point is Top of Well Casing Unless Otherwise Noted.

* Depth Below Land Surface

Project 1795 AS Wells Well 1795-AS-02

Town/City Watertown (Fort Drum)

County Jefferson State NY

Permit No. —

Land-Surface Elevation and Datum:

— feet ☐ Surveyed ☐ Estimated

Installation Date(s) —

Drilling Method 6 1/4" HSA

Drilling Contractor Nothnagle Drilling

Drilling Fluid Potable Water

Development Technique(s) and Date(s)

Air lifting 11/12/15

Fluid Loss During Drilling — gallons

Water Removed During Development ~ 39.0 gallons

Static Depth to Water 11.23 feet below M.P.

Static depth to bottom 27.00 feet below MP

Pumping Depth to Water 12.71 feet below M.P.

Pumping Duration 16 ~~hours~~ minutes

Yield — gpm Date —

Specific Capacity — gpm/ft

Well Purpose Air sparge

Remarks Final DTB: 27.00 ft BTOC

MP was with ~ 12 inches of PVC above grade

Prepared by Meghan Kiser

ARCADIS

Monitoring Well Development Log

Project/No. Fort Drum IRP 1795 AS Wells Well 1795-AS-02 Date 11/12/15

Total Depth 27.00 ft BTOC Casing Diameter (inches) 2" Purge Method

Water Level 11.23 ft BTOC Well Volume (gal) 2.52 gallons Centrifugal ____

Water Column 15.77 ft Total Volume Purged ~39.0 gallons Submersible ____

Pump On 1445 Pump Off 1501 (Other) air lifting

Developed By Kevin Busch (Nothnagle) Meghan Kuer (ARCADIS)

Well Casing Volumes

gallon/foot				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

Time	Minutes Elapsed	Rate (gpm) (mL/min)	DTW (ft)	Gallons Purged	pH	Specific Conductance (mS/cm)	Temp. (C) (F)	Turbidity (NTU)	REMARKS (PID readings, color, odor, etc.)
1450	5	2.54	12.71	12.7	7.81	3.49	13.88	12.8	—
1455	10	2.54	12.73	25.4	7.71	3.13	13.84	12.1	—
1500	15	2.54	12.69	38.1	7.66	3.02	13.71	11.4	—
More than 10 well volumes removed, turbidity less than 50 NTU									
Final DTB	27.00	ft BTOC							
Final DTW	11.29	ft BTOC							

ARCADIS

Sample/Core Log

Boring/Well 1795-AS-02 Project/No. GAP 14 DRUM REMOVAL 1795 Page 1 of 1

Site Location Fort Drum, NY Drilling Started 11/11/15 Drilling Completed 11/11/15

Total Depth Drilled 26 Feet Hole Diameter 10 inches Type of Sample/ Coring Device 2" SS x 2'

Length and Diameter of Coring Device Sampling Interval 20 - 26 feet

Land-Surface Elev. feet ☐ Surveyed ☐ Estimated Datum

Drilling Fluid Used Potable water Drilling Method 6 1/4" HSA

Drilling Contractor Nothnagle Driller Kevin Busch Helper Kyle Ryan

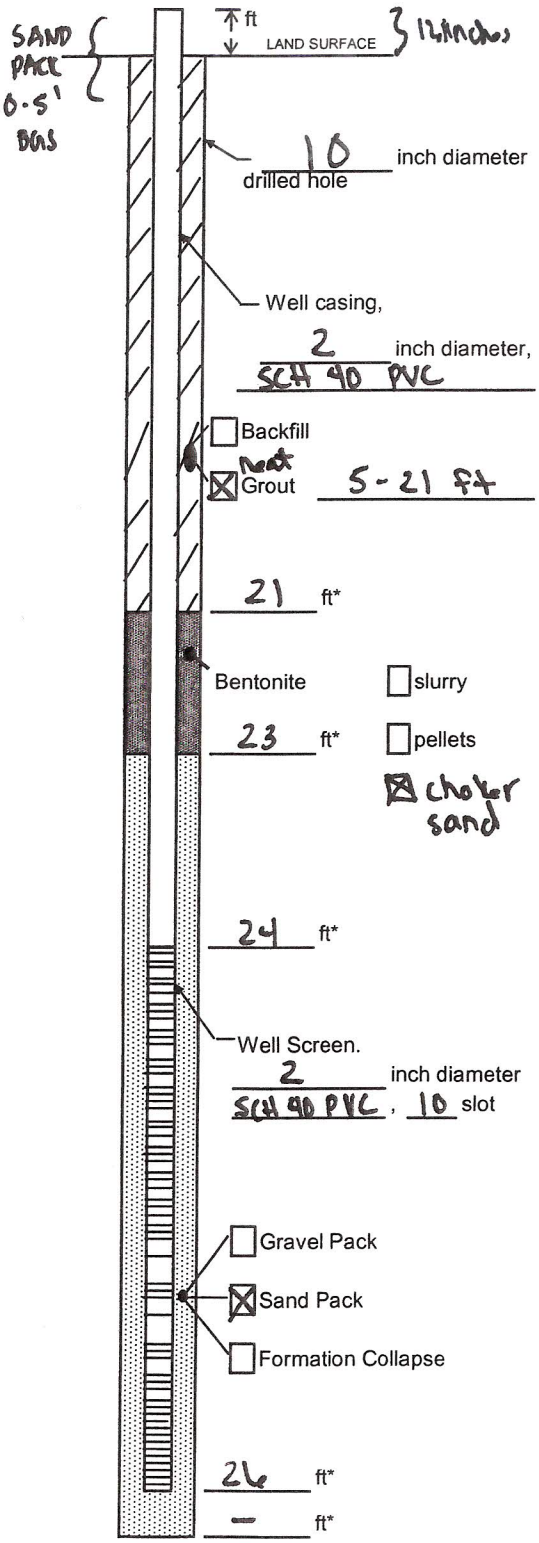
Prepared By Meghan Kiker Hammer Weight 140 Hammer Drop 30 ins.

From	To	Sample/Core Depth (feet below land surface)	Core Recovery (feet)	PID Reading (ppm)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
0.0	5.0		NA	NM	NA	hand cleared 0.0 to 5.0 ft
B	D					
L	R					
I	I					
N	L					
D	L					
20.0	22.0		1.7	@ 0.0 20.0	2-10-24-27	gray-brown, fine to medium sand, wet
				@ 0.0 20.5		(no odor)
				@ 0.0 21.0		
				@ 0.0 21.5		
22.0	24.0		2.0	@ 0.0 22.0	16-37-56-44	SAA
				@ 0.0 22.5		
				@ 0.0 23.0		
				@ 0.0 23.5		
24.0	26.0		1.7	@ 0.0 24.0	13-36-43-51	SAA
				@ 0.0 24.5		
				@ 0.0 25.0		
				@ 0.0 25.5		
EOB @	26.0 FT		BGS			SCREENED @ 24.0 TO 26.0 FT BGS

ARCADIS

Well Construction Log

(Unconsolidated)



Measuring Point is Top of Well Casing Unless Otherwise Noted.

* Depth Below Land Surface

Project 1795 AS Wells Well 1795-AS-03

Town/City Watertown (Fort Drum)

County Jefferson State NY

Permit No. _____

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) _____

Drilling Method 6 1/4" HSA

Drilling Contractor Nothnagle Drilling

Drilling Fluid Potable Water

Development Technique(s) and Date(s)

Air lifting 11/12/15

Fluid Loss During Drilling — gallons

Water Removed During Development ~ 25.00 gallons

Static Depth to Water 12.93 feet below M.P.

Static depth to bottom 27.00 feet below MP

Pumping Depth to Water 12.61 feet below M.P.

Pumping Duration 16 ~~hours~~ minutes

Yield _____ gpm Date _____

Specific Capacity _____ gpm/ft

Well Purpose Air sparge

Remarks Final DTB: 27.00 ft BTOC

MP was with ~12.1 inches of PVC above grade

Prepared by Meghan Kiser

ARCADIS

Monitoring Well Development Log

Project/No. Fort Drum IRP PFAS A Wells   Well 1795-AS-03   Date 11/12/15

Total Depth 27.00 ft BTOC   Casing Diameter (inches) 2"   Purge Method

Water Level 12.43 ft BTOC   Well Volume (gal) 2.33 gallons   Centrifugal ____   Submersible ____

Water Column 14.57 ft   Total Volume Purged ~25.00 gallons   (Other) air lifting

Pump On 1530   Pump Off 1546   Developed By Kevin Busch (Nothnagle) Meghan Kuer (ARCADIS)

Well Casing Volumes

gallon/foot	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

Time	Minutes Elapsed	Rate (gpm) (mL/min)	DTW (ft)	Gallons Purged	pH	Specific Conductance (mS/cm)	Temp. (C) (F)	Turbidity (NTU)	REMARKS (PID readings, color, odor, etc.)
1535	5	1.62	12.61	8.10	7.69	3.39	12.40	45.0	—
1540	10	1.58	12.71	16.00	7.68	3.56	12.90	12.4	—
1545	15	1.61	12.69	24.05	7.64	3.61	12.76	6.41	—
More than	10 well	volumes	removed,	turbidity less	than 50	NTU			
Final DTB:	27.10	ft BTOC							
Final DTW:	12.44	ft BTOC							

ARCADIS

Sample/Core Log

Boring/Well 1795-AS-03 Project/No. GP14DRUM.RCSC.HT95 Page 1 of 1

Site Location Fort Drum, NY Drilling Started 11/11/15 Drilling Completed 11/11/15

Total Depth Drilled 26 Feet Hole Diameter 10 inches Type of Sample/ Coring Device 2" SS x 2'

Length and Diameter of Coring Device

Sampling Interval 20 - 26 feet

Land-Surface Elev. feet ☐ Surveyed ☐ Estimated Datum

Drilling Fluid Used Potable Water Drilling Method 6 1/4" HSA

Drilling Contractor Nothnagle Driller Kevin Bush Helper Kyle Lyon

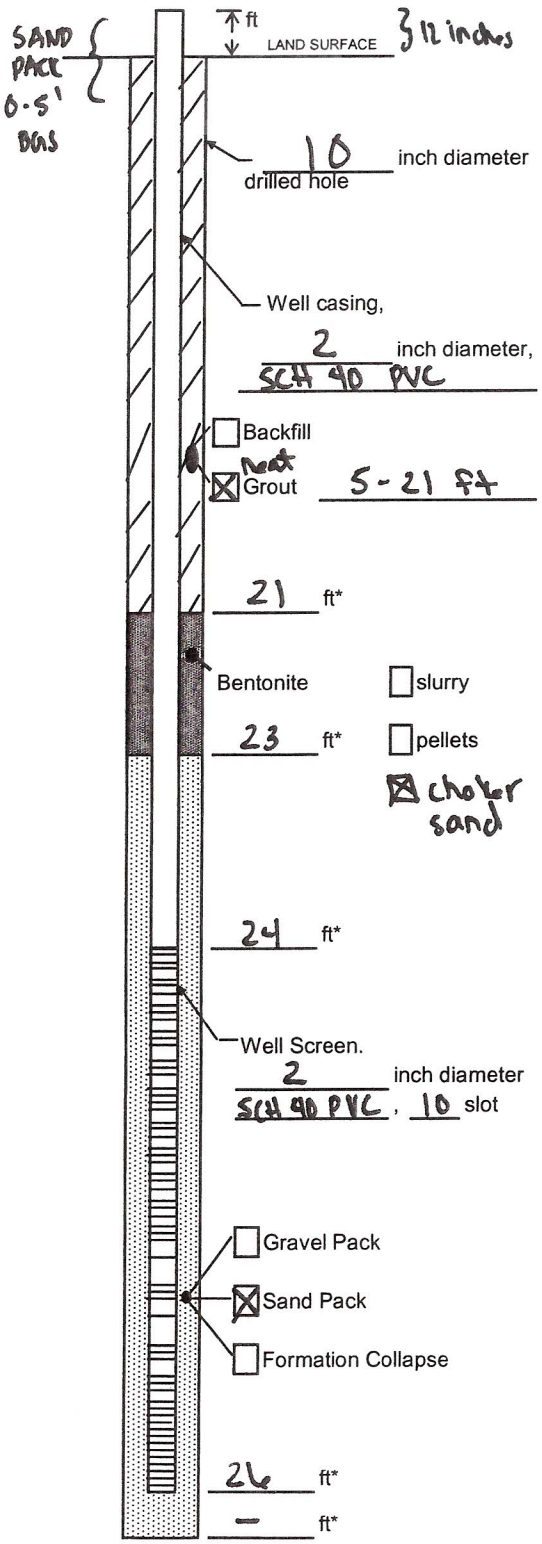
Prepared By Meghan Risser Hammer Weight 140 Hammer Drop 30 ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	PID Reading (ppm)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
0.0	5.0	NA	NM	NA	hand cleared 0.0 to 5.0 FT
B D					
L R					
I I					
N L					
D L					
20.0	22.0	1.6	0.6 @ 20.0	5-22-48-47	gray-brown, fine to medium sand, wet (with black staining @ 20.0 TO 20.8 FT BGS] (slight odor)
			1.1 @ 20.5		
			1.9 @ 21.0		
			1.2 @ 21.5		
22.0	24.0	1.5	1.4 @ 22.0	9-21-48-50	gray-brown, fine to medium sand, wet (slight odor)
			1.4 @ 22.5		
			1.1 @ 23.0		
			1.6 @ 23.5		
24.0	26.0	1.8	1.1 @ 24.0	12-29-40-49	SAA
			1.5 @ 24.5		
			0.7 @ 25.0		
			0.6 @ 25.5		
EOB @	24.0	FT BGS			SCREENED AT 24.0 TO 26.0 FT BGS

ARCADIS

Well Construction Log

(Unconsolidated)



Measuring Point is Top of Well Casing Unless Otherwise Noted.

* Depth Below Land Surface

Project 1795 AS Wells Well 1795-AS-04

Town/City Watertown (Fort Drum)

County Jefferson State NY

Permit No. —

Land-Surface Elevation and Datum:

— feet ☐ Surveyed ☐ Estimated

Installation Date(s) —

Drilling Method 6 1/4" HSA

Drilling Contractor Nothnagle Drilling

Drilling Fluid Potable Water

Development Technique(s) and Date(s)

Air lifting 11/12/15

Fluid Loss During Drilling — gallons

Water Removed During Development ~50.0 gallons

Static Depth to Water 11.98 feet below M.P.

Static depth to bottom 26.90 feet below MP

Pumping Depth to Water 14.24 feet below M.P.

Pumping Duration 31 ~~hours~~ minutes

Yield — gpm Date —

Specific Capacity — gpm/ft

Well Purpose Air sparge

Remarks Final DTB: 27.00 ft BTOC

MP was with ~12 inches of PVC above grade

Prepared by Meghan Kiser

ARCADIS

Monitoring Well Development Log

Project/No. Fort Drum IRP PFAS AS Wells Well 1795-AS-04 Date 11/12/15

Total Depth 26.90 ft BTOC Casing Diameter (inches) 2" Purge Method

Water Level 11.98 ft BTOC Well Volume (gal) 2.39 gallons Centrifugal ____

Water Column 14.92 ft Total Volume Purged ~50.0 gallons Submersible ____

Pump On 1400 Pump Off 1431 (Other) airlifting

Developed By Kevin Bush (nothnagle)

Well Casing Volumes

gallon/foot			
1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

Time	Minutes Elapsed	Rate (gpm) (mL/min)	DTW (ft)	Gallons Purged	pH	Specific Conductance (mS/cm)	Temp. (C) (F)	Turbidity (NTU)	REMARKS (PID readings, color, odor, etc.)
1410	10	1.53	14.24	15.3	7.67	4.01	12.55	26.3	—
1420	20	1.51	14.27	30.4	7.68	3.69	12.84	16.2	—
1430	30	1.89	14.25	49.3	7.68	3.78	12.83	4.42	—
More than 10 well volume removed, turbidity less than 50 NTU									
Final DTB	27.00	ft BTOC							
Final DTW	11.98	ft BTOC							

ARCADIS

Sample/Core Log

Boring/Well 1795-AS-04 Project/No. GP14 DRMM. RCSL. #1795 Page 1 of 1

Site Location Fort Drum, NY Drilling Started 11/10/15 Drilling Completed 11/10/15

Total Depth Drilled 26 Feet Hole Diameter 10 inches Type of Sample/ Coring Device 2" SS x 2'

Length and Diameter of Coring Device _____ Sampling Interval 20 - 26 feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used Potable water Drilling Method 6 1/4" HSA

Drilling Contractor Nothnagle Driller Kevin Bush Helper Kyle Ryan

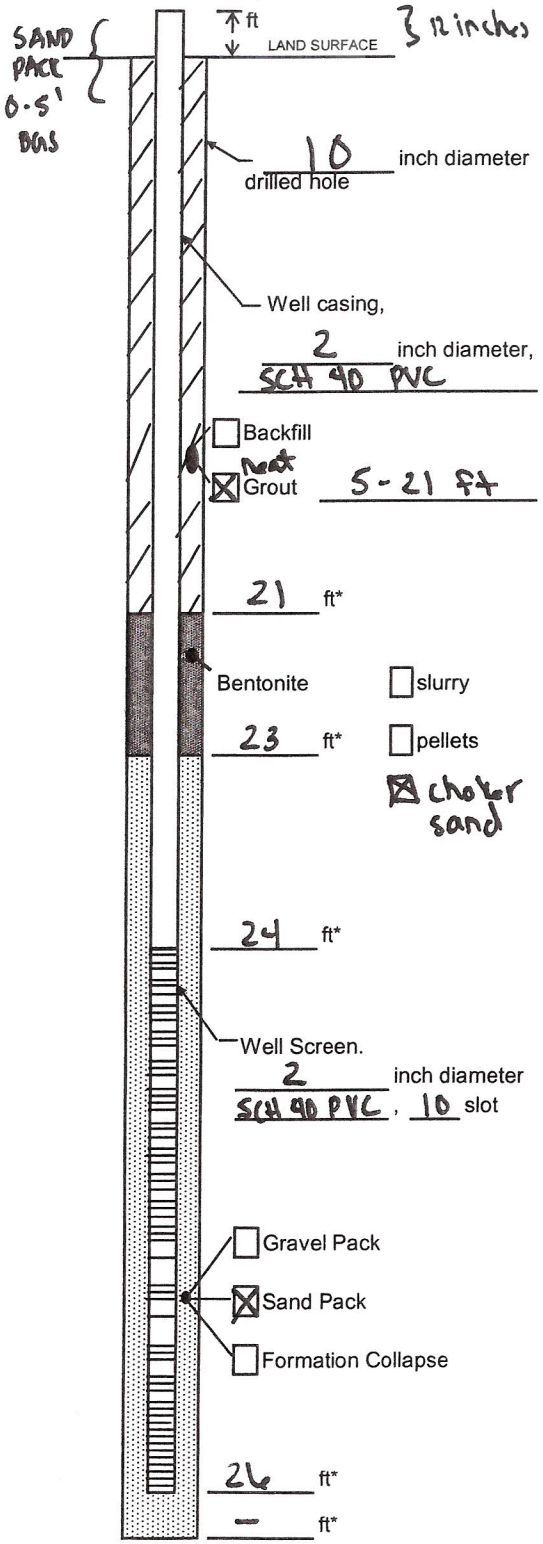
Prepared By Meghan River Hammer Weight 140 Hammer Drop 30 ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	PID Reading (ppm)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
0.0	5.0	NA	NH	NA	hand cleared 0.0 TO 5.0 FT BGS
B D					
L R					
I J					
N L					
D L					
20.0	22.0	1.8	0.0 @ 20.0	29-36-51-54	trace gravel, gray-brown, fine to medium sand, wet [20.0 - 20.3 FT]
			0.0 @ 20.5		(no odor)
			0.0 @ 21.0		gray-brown, fine sand, wet [20.3 TO 21.8 FT BGS]
			0.0 @ 21.5		(no odor)
22.0	24.0	2.0	0.0 @ 22.0	16-31-51-50	gray-brown, fine sand, wet, dense
			0.0 @ 22.5		(no odor)
			0.0 @ 23.0		
			0.0 @ 23.5		
24.0	26.0	1.9	0.0 @ 24.0	15-37-44-52	SAA
			0.0 @ 24.5		
			0.0 @ 25.0		
			0.0 @ 25.5		
EOB @	26.0 FT	BGS			SCREENED @ 24.0 TO 26.0 FT BGS

ARCADIS

Well Construction Log

(Unconsolidated)



Measuring Point is Top of Well Casing Unless Otherwise Noted.

* Depth Below Land Surface

Project: 1795 AS Wells Well: 1795-AS-05

Town/City: Watertown (Fort Drum)

County: Jefferson State: NY

Permit No.:

Land-Surface Elevation and Datum:

____ feet ☐ Surveyed ☐ Estimated

Installation Date(s):

Drilling Method: 6 1/4" HSA

Drilling Contractor: Nothnagle Drilling

Drilling Fluid: Potable Water

Development Technique(s) and Date(s)

Air lifting 11/12/15

Fluid Loss During Drilling: — gallons

Water Removed During Development: ~ 31.0 gallons

Static Depth to Water: 10.43 feet below M.P.

static depth to bottom: 26.96 feet below MP

Pumping Depth to Water: 12.68 feet below M.P.

Pumping Duration: 31 ~~hours~~ minutes

Yield: ____ gpm Date:

Specific Capacity: ____ gpm/ft

Well Purpose: Air sparge

Remarks: Final DTB: 27.00 ft BTOC

MP was with ~12 inches of PVC above grade

Prepared by: Meghan Kiser

ARCADIS

Monitoring Well Development Log

Project/No. Fort Drum IRP 1795 AS Weeks Well 1795-AS-05 Date 11/12/15

Total Depth 26.96 ft BTOC
Water Level 10.43 ft BTOC
Water Column 16.53 ft
Pump On 1200

Casing Diameter (inches) 2"
Well Volume (gal) 2.64 gallons
Total Volume Purged ~ 31.0 gallons
Pump Off 1231

Purge Method
Centrifugal _____
Submersible _____
(Other) air lifting
Developed By Kevin Busch (Arthmagh) Meghan Neer (ARCADIS)

Well Casing Volumes

gallon/foot				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

Time	Minutes Elapsed	Rate (gpm) (mL/min)	DTW (ft)	Gallons Purged	pH	Specific Conductance (mS/cm)	Temp. (C) (F)	Turbidity (NTU)	REMARKS (PID readings, color, odor, etc.)
1210	10	1.02	12.68	10.2	7.65	3.34	11.41	21.1	—
1220	20	1.02	12.65	20.4	7.62	3.32	11.63	9.19	—
1230	30	1.02	12.62	30.6	7.68	3.31	11.57	6.24	—
More than 10 well volumes removed turb duly less than 50 NTU									
Final PTB:	27.00	ft BTOC							
Final PTW:	10.42	ft BTOC							

ARCADIS

Sample/Core Log

Boring/Well 1795-AS-05 Project/No. GP14 DRUM. RCSC. H1795 Page 1 of 1

Site Location Fort Drum, NY Drilling Started 11/6/15 Drilling Completed 11/10/15

Total Depth Drilled 26 Feet Hole Diameter 10 inches Type of Sample/ Coring Device 2" SS x 2'

Length and Diameter of Coring Device _____ Sampling Interval 20 - 26 feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used Potable water Drilling Method 6 1/4" HSA

Drilling Contractor Nothnagle Driller Kevin Busch Helper Kyle Ryan

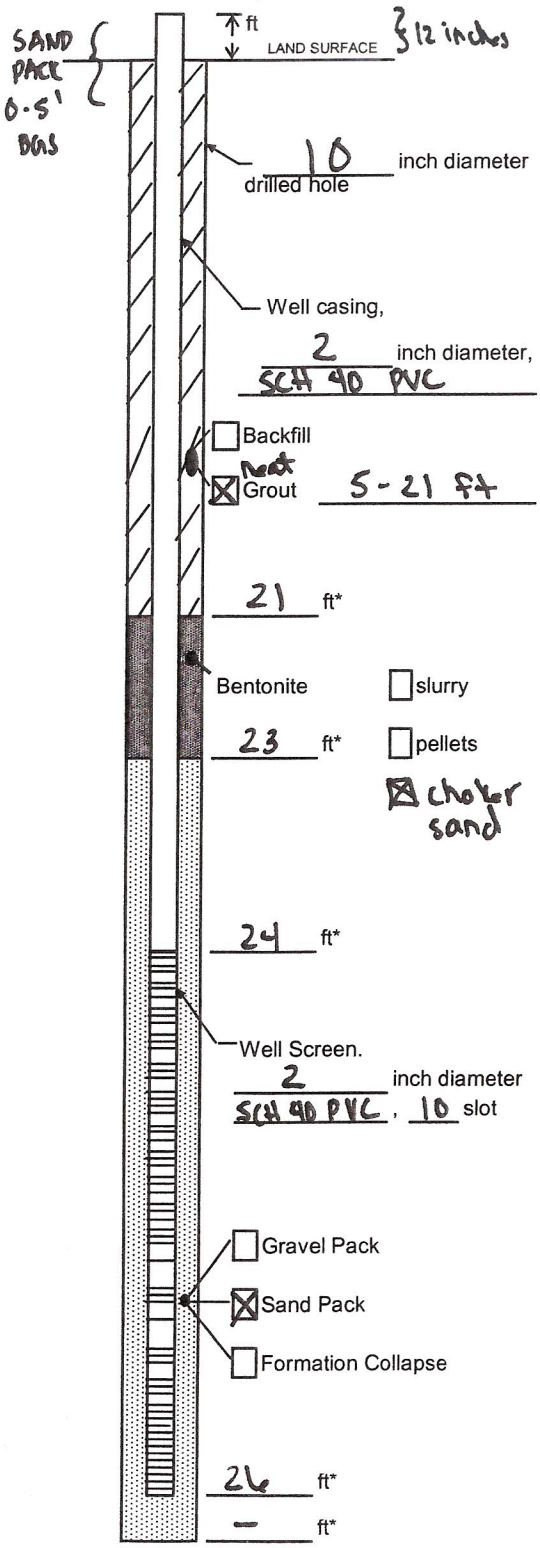
Prepared By Meghan Kiser Hammer Weight 140 Hammer Drop 30 ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	PID Reading (ppm)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
0.0	5.0	NA	NM	NA	hand cleared 0.0 to 5.0 Ft
B D					
L R					
I I					
N L					
D L					
20.0	22.0	2.0	0.0 @ 20.0	6-25-38-50	gray, fine to medium sand, wet, dense [20.0 to 20.7 Ft]
			0.0 @ 20.5		(no odor)
			0.0 @ 21.0		brown, fine sand, wet, dense [20.7 to 22.0 Ft]
			0.0 @ 21.5		(no odor)
22.0	24.0	1.6	0.0 @ 22.0	16-29-50-50	gray-brown, fine sand, wet, dense
			0.0 @ 22.5		(no odor)
			0.0 @ 23.0		
			0.0 @ 23.5		
24.0	26.0	1.8	0.0 @ 24.0	16-39-50-50	SAA
			@ 24.5		
			@ 25.0		
			@ 25.5		
EOB @	26.0 Ft	BGS			SCREENED @ 24.0 TO 26.0 Ft BGS

ARCADIS

Well Construction Log

(Unconsolidated)



Measuring Point is Top of Well Casing Unless Otherwise Noted.

* Depth Below Land Surface

Project 1795 AS Wells Well 1795-AS-06

Town/City Watertown (Fort Drum)

County Jefferson State NY

Permit No. —

Land-Surface Elevation and Datum:

— feet ☐ Surveyed ☐ Estimated

Installation Date(s) —

Drilling Method 6 1/4" HSA

Drilling Contractor Nothnagle Drilling

Drilling Fluid Potable Water

Development Technique(s) and Date(s)

Air lifting 11/12/15

Fluid Loss During Drilling — gallons

Water Removed During Development ~28.0 gallons

Static Depth to Water 14.51 feet below M.P.

static depth to bottom 27.00 feet below MP

Pumping Depth to Water 15.03 feet below M.P.

Pumping Duration 21 ~~hours~~ minutes

Yield — gpm Date —

Specific Capacity — gpm/ft

Well Purpose Air sparge

Remarks Final DTB: 27.00 ft BTOC

MP was with ~ 12 inches of PVC above grade

Prepared by Meghan Kiser

ARCADIS

Monitoring Well Development Log

Project/No. Fort Drum IRP 1795 AS Wells Well 1795-AS-06 Date 11/12/15

Total Depth 27.0 ft BTOC Casing Diameter (inches) 2"

Water Level 14.51 ft BTOC Well Volume (gal) 1.99 gallons

Water Column 12.49 ft Total Volume Purged ~ 28.0 gallons

Pump On 1120 Pump Off 1141

Purge Method: Centrifugal ____ Submersible ____ (Other) air lifting

Developed By Kevin Busch (Arcadis) Meghan River (ARCADIS)

Well Casing Volumes

gallon/foot				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

Time	Minutes Elapsed	Rate (gpm) (mL/min)	DTW (ft)	Gallons Purged	pH	Specific Conductance (mS/cm)	Temp. (C) (F)	Turbidity (NTU)	REMARKS (PID readings, color, odor, etc.)
1130	10	1.36	15.03	13.60	7.71	4.78	12.08	40.7	—
1135	15	1.36	15.03	20.40	7.60	4.01	12.22	14.9	petroleum-like odor
1140	20	1.36	15.03	27.20	7.64	4.01	12.07	4.02	petroleum-like odor
More than 10	well	volumes	removed,	turbidity	less	than	50	NTU	
Final DTB:	27.00	ft BTOC							
Final DTW:	14.54	ft BTOC							

ARCADIS

Sample/Core Log

Boring/Well 1795-AS-06 Project/No. GNPLYDRUM.RCSC.HTRS Page 1 of 1

Site Location Fort Drum, NY Drilling Started 11/10/15 Drilling Completed 11/10/15

Total Depth Drilled 26 Feet Hole Diameter 10 inches Type of Sample/ Coring Device 2" SS x 2'

Length and Diameter of Coring Device Sampling Interval 20-26 feet

Land-Surface Elev. feet ☐ Surveyed ☐ Estimated Datum

Drilling Fluid Used Potable Water Drilling Method 6 1/4" HSA

Drilling Contractor Nothnagle Driller Kevin Busch Helper Kyle Ryan

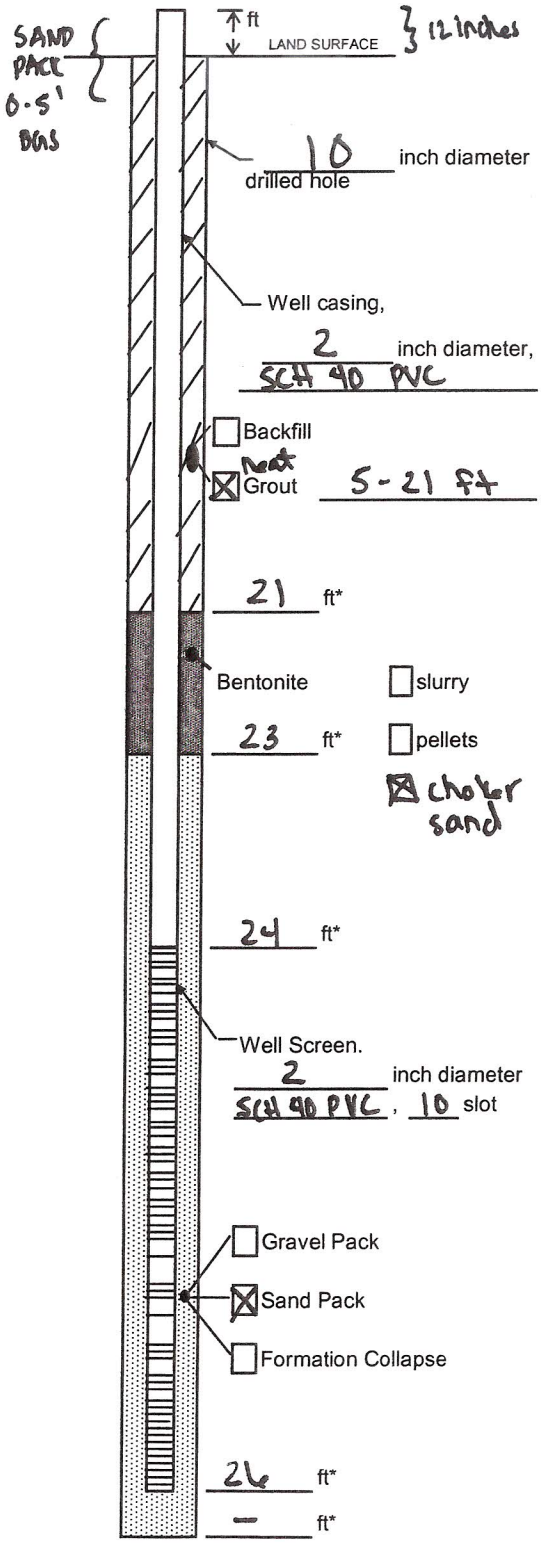
Prepared By Meghan Kiser Hammer Weight 140 Hammer Drop 30 ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	PID Reading (ppm)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
0.0	5.0	NA	NM	NA	hand cleared 0.0 to 5.0 ft
B D					
L R					
I I					
N L					
D L					
20.0	22.0	1.6	1.1 @ 20.0	3-4-7-26	gray fine to medium sand, wet
			0.9 @ 20.5		(slight odor)
			1.8 @ 21.0		
			0.7 @ 21.5		
22.0	24.0	1.6	0.3 @ 22.0	12-32-47-51	gray, fine sand, wet
			0.5 @ 22.5		(slight odor)
			0.7 @ 23.0		
			0.4 @ 23.5		
24.0	26.0	1.7	0.0 @ 24.0	25-34-45-50	gray-brown, fine sand, wet, dense
			0.0 @ 24.5		(no odor)
			0.0 @ 25.0		
			0.0 @ 25.5		
EOB @	26.0 FT	BGS			Screened @ 24.0 TO 26.0 FT BGS

ARCADIS

Well Construction Log

(Unconsolidated)



Measuring Point is Top of Well Casing Unless Otherwise Noted.

* Depth Below Land Surface

Project: 1795 AS Wells Well: 1795-AS-07

Town/City: Watertown (Fort Drum)

County: Jefferson State: NY

Permit No.:

Land-Surface Elevation and Datum:

____ feet ☐ Surveyed ☐ Estimated

Installation Date(s):

Drilling Method: 6 1/4" HSA

Drilling Contractor: Nothnagle Drilling

Drilling Fluid: Potable Water

Development Technique(s) and Date(s)

Air lifting 11/12/15

Fluid Loss During Drilling: — gallons

Water Removed During Development: ~26.0 gallons

Static Depth to Water: 14.43 feet below M.P.

Static depth to bottom: 27.00 feet below MP

Pumping Depth to Water: 15.13 feet below M.P.

Pumping Duration: 26 ~~hours~~ minutes

Yield: ____ gpm Date: ____

Specific Capacity: ____ gpm/ft

Well Purpose: Air sparge

Remarks: Final DTB:

MP was with ~12 inches of PVC above grade

Prepared by: Meghan Kiser

ARCADIS

Monitoring Well Development Log

Project/No. Fort Drum IRP 1795 AS Wells Well 1795-AS-07 Date 11/12/15

Total Depth 27.00 ft BTOC Casing Diameter (inches) 2"

Water Level 14.43 ft BTOC Well Volume (gal) 2.01 gallons

Water Column 12.57 ft Total Volume Purged ~26.0 gallons

Pump On 1040 Pump Off 1106

Purge Method: Centrifugal _____ Submersible _____ (Other) air lifting

Developed By Kevin Rusch (Nothnagle) Meghan Neer (Arcadis)

Well Casing Volumes

gallon/foot				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

Time	Minutes Elapsed	Rate (gpm) (mL/min)	DTW (ft)	Gallons Purged	pH	Specific Conductance (mS/cm)	Temp. (C) (F)	Turbidity (NTU)	REMARKS (PID readings, color, odor, etc.)
1045	5	1.02	15.13	5.1	7.38	2.74	12.78	11.88	-
1050	10	1.02	15.13	10.2	7.43	2.68	12.76	9.87	-
1055	15	1.02	15.13	15.3	7.48	2.64	12.73	6.98	-
1100	20	1.02	15.12	20.4	7.51	2.58	12.71	4.90	-
1105	25	1.02	15.12	25.5	7.52	2.56	12.66	4.68	-
More than 10 well volumes removed, turbidity less than 50 NTUs									
Final BTB	27.00	ft BTOC							
Final DTW	14.47	ft BTOC							

ARCADIS

Sample/Core Log

Boring/Well 1795-AS-07 Project/No. GP14DRUM, RCSC. #1795 Page 1 of 1

Site Location Fort Drum, NY Drilling Started 11/09/15 Drilling Completed 11/09/15

Total Depth Drilled 26 Feet Hole Diameter 10 inches Type of Sample/ Coring Device 2" SS x 2'

Length and Diameter of Coring Device Sampling Interval 20 - 26 feet

Land-Surface Elev. feet ☐ Surveyed ☐ Estimated Datum

Drilling Fluid Used Potable Water Drilling Method 6 1/4" HSA

Drilling Contractor Nothnagle Driller Kevin Busch Helper Kyle Ryan

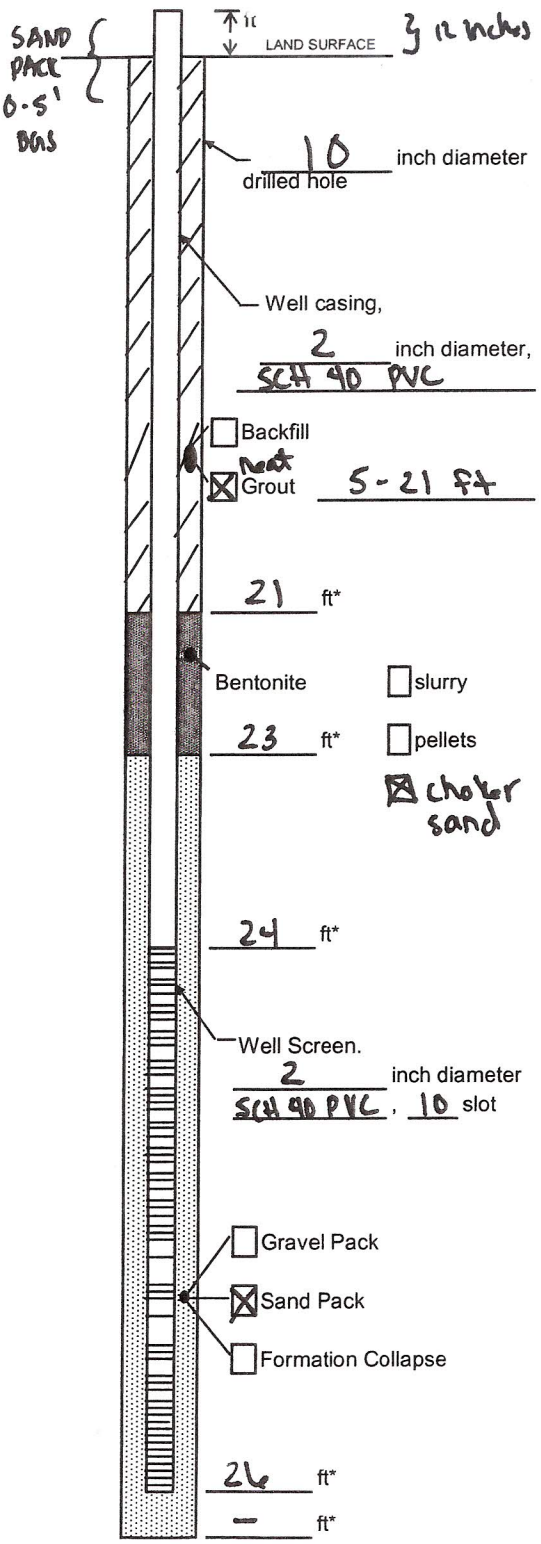
Prepared By Meghan Kiser Hammer Weight 140 Hammer Drop 30 ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	PID Reading (ppm)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
0.0	5.0	NA	NM	NA	hand cleared 0.0 to 5.0 ft
B P					
L R					
I I					
N L					
D L					
20.0	22.0	1.4	0.6 @ 20.0	21-36-52-64	gray, fine sand, wet, dense
			0.3 @ 20.5		(slight odor)
			0.3 @ 21.0		
			NM @ 21.5		NO recovery, NO PID reading
22.0	24.0	1.1	0.0 @ 22.0	15-54-53-NM	SAA
			0.3 @ 22.5		(no odor)
			0.2 @ 23.0		
			NM @ 23.5		NO recovery, NO PID reading
24.0	26.0	1.3	0.0 @ 24.0	16-63-54-NM	SAA
			0.0 @ 24.5		(no odor)
			0.0 @ 25.0		
			NM @ 25.5		NO recovery, NO PID reading
EOB @	26.0 FT	BGS			SCREENED @ 24.0 TO 26.0 FT BGS

ARCADIS

Well Construction Log

(Unconsolidated)



Measuring Point is Top of Well Casing Unless Otherwise Noted.

* Depth Below Land Surface

Project 1795 AS Wells Well 1795-AS-08

Town/City Watertown (Fort Drum)

County Jefferson State NY

Permit No. —

Land-Surface Elevation and Datum:

— feet ☐ Surveyed ☐ Estimated

Installation Date(s) —

Drilling Method 6 1/4" HSA

Drilling Contractor Nothnagle Drilling

Drilling Fluid Potable Water

Development Technique(s) and Date(s)

Air lifting 11/12/15

Fluid Loss During Drilling — gallons

Water Removed During Development ~30.70 gallons

Static Depth to Water 14.70 feet below M.P.

Static depth to bottom 27.00 feet below M.P.

Pumping Depth to Water 15.94 feet below M.P.

Pumping Duration 25 ~~hours~~ minutes

Yield — gpm Date —

Specific Capacity — gpm/ft

Well Purpose Air sparge

Remarks Final DTB: 27.00 ft BTOC

MP was with ~12 inches of PVC above grade

Prepared by Meghan Kiser

ARCADIS

Monitoring Well Development Log

Project/No. Fort Drum IRP 1795 AS Well Well 1795-AS-08 Date 11/12/15

Total Depth 27.00 FT BTOC Casing Diameter (inches) 2" Purge Method

Water Level 14.70 FT BTOC Well Volume (gal) 1.97 gallons Centrifugal ____

Water Column 12.30 Ft Total Volume Purged ~30.70 gallons Submersible ____

Pump On 0955 Pump Off 1020 Other (circled): airlifting

Developed By Kevin Buck (Nothnagle) Meghan Kurd (ARCADIS)

Well Casing Volumes

gallon/foot				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

Time	Minutes Elapsed	Rate (gpm) (circled) (mL/min)	DTW (ft)	Gallons Purged	pH	Specific Conductance (mS/cm)	Temp. (C) (circled) (F)	Turbidity (NTU)	REMARKS (PID readings, color, odor, etc.)
1000	5	1.87	15.94	8.35	7.64	3.71	12.08	9.93	petroleum-like odor
1010	15	1.21	16.05	20.40	7.60	3.83	12.27	7.35	petroleum-like odor
1015	20	1.24	16.05	26.60	7.70	3.77	12.38	6.40	petroleum-like odor
1020	25	0.82	16.05	30.70	7.65	3.78	12.36	5.98	petroleum-like odor
More than 10 well volumes removed, turbidity less than 50 NTUs									
Final DTB:	27.00	FT BTOC							
Final DTW:	14.73	FT BTOC							

ARCADIS

Sample/Core Log

Boring/Well 1795-AS-08 Project/No. GP14 DRUM, RCSC. #1795 Page 1 of 1

Site Location Fort Drum, NY Drilling Started 11/09/15 Drilling Completed 11/09/15

Total Depth Drilled 26 Feet Hole Diameter 10 inches Type of Sample/ Coring Device 2" SS x 2'

Length and Diameter of Coring Device _____ Sampling Interval 20-26 feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used Potable Water Drilling Method 6 1/4" HSA

Drilling Contractor Nothnagle Driller Kevin Burch Helper Kyle Ryan

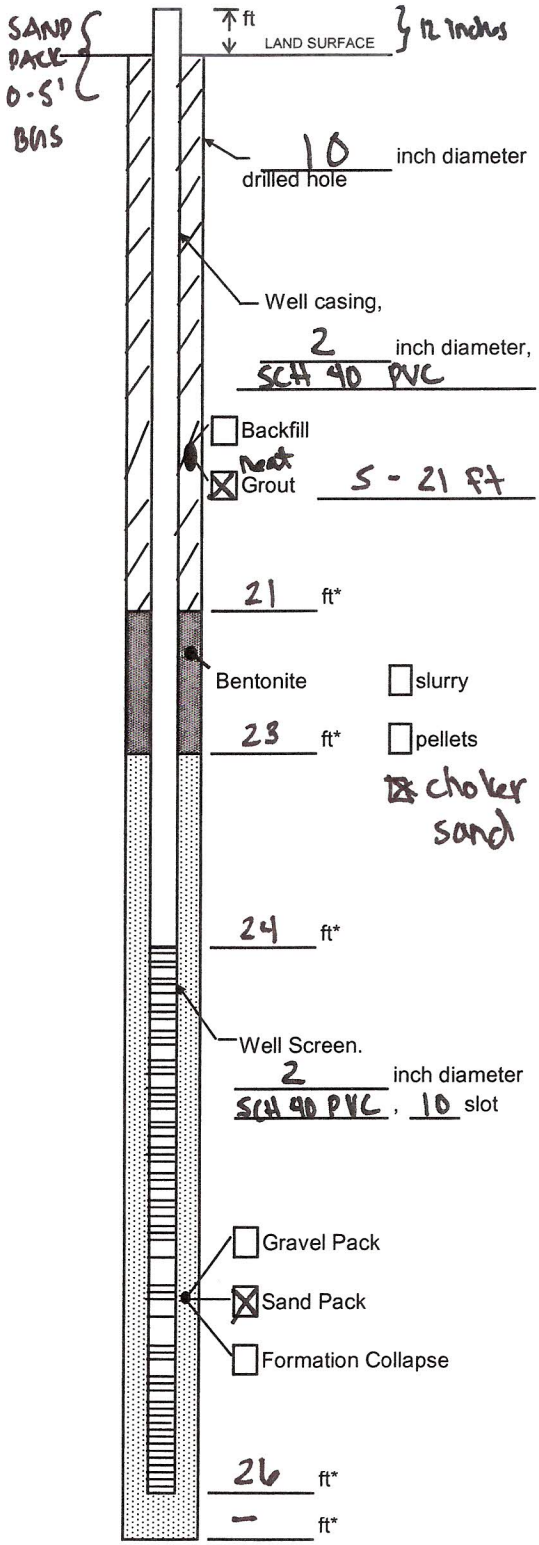
Prepared By Meghan Kiser Hammer Weight 140 Hammer Drop 30 ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	PID Reading (ppm)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
0.0	5.0	NA	NM	NA	hand cleared 0.0 to 5.0 FT
B D					
L R					
I I					
N L					
D L					
20.0	22.0	2.0	0.0 @ 20.0	3-7-21-59	gray, fine sand, wet, dense
			0.0 @ 20.5		(slight odor)
			0.0 @ 21.0		
			0.8 @ 21.5		
22.0	24.0	1.6	0.1 @ 22.0	19-31-51-50	gray-brown, fine sand, wet, dense
			0.0 @ 22.5		(no odor)
			0.0 @ 23.0		
			0.0 @ 23.5		
24.0	26.0	1.3	0.0 @ 24.0	12-50-50-NM	SAA
			0.0 @ 24.5		
			0.0 @ 25.0		
			NM @ 25.5		NO RECOVERY, NO PID READING
EOB @	26.0 FT	BGS			SCREENED @ 24.0 TO 26.0 FT BGS

ARCADIS

Well Construction Log

(Unconsolidated)



Measuring Point is Top of Well Casing Unless Otherwise Noted.

* Depth Below Land Surface

Project: 1795 AS Wells Well: 1795-AS-09

Town/City: Watertown (Fort Drum)

County: Jefferson State: NY

Permit No.:

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s): 11/05/15

Drilling Method: 6 1/4" HSA

Drilling Contractor: Nothnagle Drilling

Drilling Fluid: Potable Water

Development Technique(s) and Date(s)

Air lifting 11/12/15

Fluid Loss During Drilling: — gallons

Water Removed During Development: ~19.55 gallons

Static Depth to Water: 17.41 feet below M.P.

static depth to bottom: 26.98 feet below M.P.

Pumping Depth to Water: 18.12 feet below M.P.

Pumping Duration: 20 ~~hours~~ minutes

Yield: _____ gpm Date: _____

Specific Capacity: _____ gpm/ft

Well Purpose: Air sparge

Remarks: Final DTB: 27.00 ft BTOC

MP was with ~ 12 inches of PVC above grade

Prepared by: Meghan Kiser

ARCADIS

Monitoring Well Development Log

Project/No. Fort Drum IRP PFAS Wells Well 1795-AS-09 Date 11/12/15

Total Depth 26.98 ft BTOC Casing Diameter (inches) 2"

Water Level 17.41 ft BTOC Well Volume (gal) 1.53 gallons

Water Column 9.57 ft Total Volume Purged ~19.55 gallons

Pump On 0920 Pump Off 0940

Purge Method: Centrifugal ____ Submersible ____ (Other) air lifting

Developed By Kevin Bush (Nothnagle) Meghan Kerr (Arcadis)

Well Casing Volumes

gallon/foot				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

Time	Minutes Elapsed	Rate (gpm) (mL/min)	DTW (ft)	Gallons Purged	pH	Specific Conductance (mS/cm)	Temp. (C) (F)	Turbidity (NTU)	REMARKS (PID readings, color, odor, etc.)
0925	5	1.53	18.12	7.65	7.54	1.74	11.94	30.3	—
0930	10	1.02	17.91	12.75	7.62	1.68	12.03	18.9	—
0935	15	0.85	17.87	15.30	7.66	1.59	12.03	12.4	—
0940	20	0.85	17.78	19.55	7.65	1.28	12.91	12.18	—
More than 10 well volumes removed, turbidity less than 50 NTU									
Final DTB:	27.00	ft BTOC							
Final DTW:	17.41	ft BTOC							

ARCADIS

Sample/Core Log

Boring/Well 1795-AS-09 Project/No. GDMPRUM. RCSC. H1795 Page 1 of 1

Site Location Fort Drum, NY

Drilling Started 11/05/15 Drilling Completed 11/05/15

Total Depth Drilled 26 Feet Hole Diameter ____ inches Type of Sample/ Coring Device 2" x 5S x 2'

Length and Diameter of Coring Device ____ Sampling Interval 20-26 feet

Land-Surface Elev. ____ feet ☐ Surveyed ☐ Estimated Datum ____

Drilling Fluid Used Potable Water Drilling Method 6 1/4" HSA

Drilling Contractor Nothnagle Driller Kevin Rusch Helper Kyle Ryan

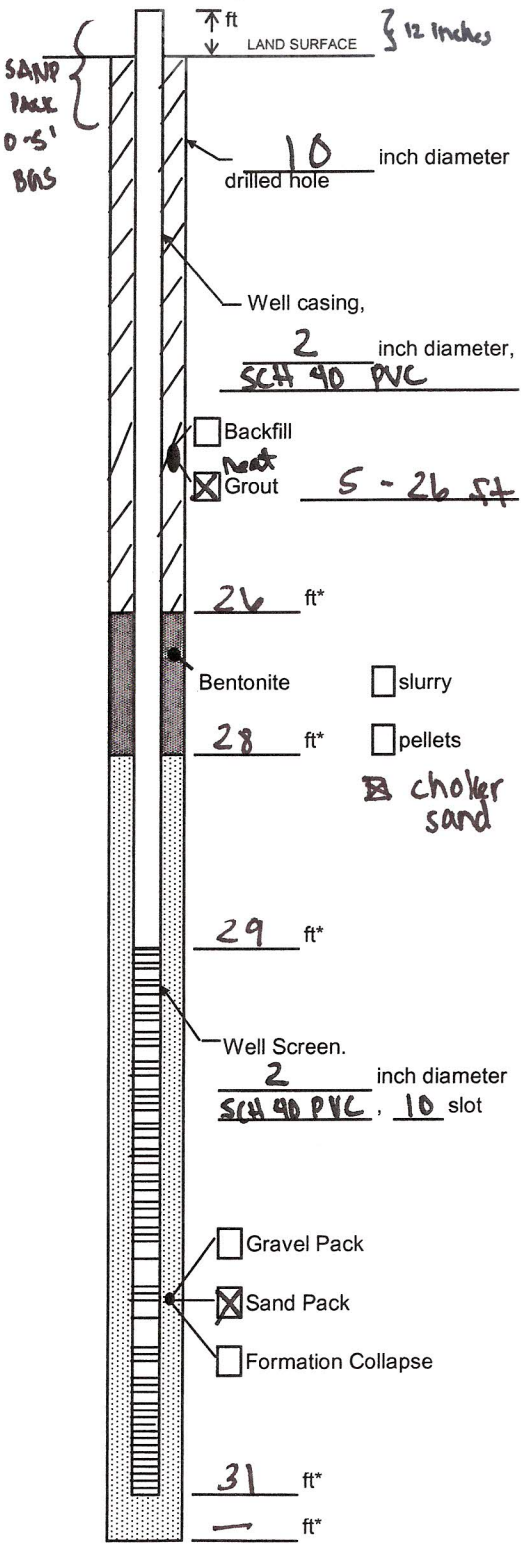
Prepared By Meghan Kiser Hammer Weight 140 Hammer Drop 30 ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	PID Reading (ppm)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
0.0	5.0	NA	NH	NA	hand cleared 0.0 TO 5.0 FT BGS
B D					
L R					
I I					
N L					
D L					
20.0	22.0	1.7	0.0 @ 20.0	19-34-48-90	gray-brown, fine to medium sand, wet
			0.0 @ 20.5		(no odors)
			0.0 @ 21.0		
			0.0 @ 21.5		
22.0	24.0	1.1	0.0 @ 22.0	17-34-48-10	SAA
			0.0 @ 22.5		
			NH @ 23.0		
			NH @ 23.5		
24.0	26.0	1.2	0.0 @ 24.0	19-48-50-17	SAA
			0.0 @ 24.5		
			NH @ 25.0		
			NH @ 25.5		
EOB @	26.0 FT	BGS			SCREEN @ 24.0 FT TO 26.0 FT BGS

ARCADIS

Well Construction Log

(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project: 1795 AS Wells Well: 1795-AS-10

Town/City: Watertown (Fort Drum)

County: Jefferson State: NY

Permit No.:

Land-Surface Elevation and Datum:

____ feet ☐ Surveyed ☐ Estimated

Installation Date(s): 11/05/15

Drilling Method: 6 1/4" HSA

Drilling Contractor: Nothnagle Drilling

Drilling Fluid: Potable Water

Development Technique(s) and Date(s)

Air lifting 11/12/15

Fluid Loss During Drilling: — gallons

Water Removed During Development: ~ 33.00 gallons

Static Depth to Water: 19.56 ft feet below M.P.

Static depth to Bottom: 32.00 ft Feet below MP

Pumping Depth to Water: 20.13 feet below M.P.

Pumping Duration: 21 ~~hours~~ minutes

Yield: ____ gpm Date: ____

Specific Capacity: ____ gpm/ft

Well Purpose: Air sparge

Remarks: Final DTB: 32.00 ft BTOC

MP was with ~ 12 inches of PVC above grade

Prepared by: Meghan Kiser

ARCADIS

Monitoring Well Development Log

Project/No. Fort Drum IRP FTS AS Wells Well 1FTS-AS-10 Date 11/12/15

Total Depth 32.00 ft BTOC Casing Diameter (inches) 2" Purge Method: Centrifugal ____

Water Level 19.56 ft BTOC Well Volume (gal) 1.99 gallons Submersible ____

Water Column 12.44 ft Total Volume Purged ~ 33.00 gallons (Other) air lifting

Pump On 0840 Pump Off 0901 Developed By Kevin Rusch (Nothnagle) Meghan Kerr (ARCADIS)

Well Casing Volumes

gallon/foot				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

Time	Minutes Elapsed	Rate (gpm) (mL/min)	DTW (ft)	Gallons Purged	pH	Specific Conductance (mS/cm)	Temp. (C) (F)	Turbidity (NTU)	REMARKS (PID readings, color, odor, etc.)
0850	10	1.79	20.13	17.85	7.57	2.38	11.19	9.53	—
0855	15	1.53	20.14	25.50	7.65	2.34	11.56	6.25	—
0900	20	1.36	20.14	32.30	7.59	2.39	11.39	6.76	—
More than 10		well volumes	removed,	turbidity less than 50				NTU	
Final DTB:	32.00	FT BTOC							
Final DTW:	18.56	FT BTOC							

ARCADIS

Sample/Core Log

Boring/Well 1795-AS-10 Project/No. GP14 DRUM. RESC. H1795 Page 1 of 2

Site Location Fort Drum, NY

Drilling Started 11/05/15 Drilling Completed 11/05/15

Total Depth Drilled 31 Feet Hole Diameter 10 inches Type of Sample/ Coring Device 2" x 5S x 2'

Length and Diameter of Coring Device

Sampling Interval feet

Land-Surface Elev. feet ☐ Surveyed ☐ Estimated Datum

Drilling Fluid Used Potable water Drilling Method 6 1/4" HSA

Drilling Contractor Nothnagle Driller ~~Kyle~~ (DD) Kevin Bush Helper Kyle Kyan

Prepared By Meghan Kiser Hammer Weight 140 Hammer Drop 30 ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	PID Reading (ppm)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
0.0	5.0	NA	NM	NA	hand cleared 0.0 TO 5.0 FT BGS
B D					
L R					
I I					
N L					
D L					
19.0	21.0	1.6	0.0 @ 19.0	8-16-16-20	gray-brown, fine sand, wet
			0.0 @ 19.5		(no odor)
			0.0 @ 20.0		
			0.5 @ 20.5		
21.0	23.0	1.6	0.0 @ 21.0	3-10-19-24	gray-brown, fine to medium sand, wet, dense
			0.1 @ 21.5		(no odor)
			0.4 @ 22.0		
			0.3 @ 22.5		
23.0	25.0	1.3	0.2 @ 23.0	3-14-27-42	gray-brown, fine sand, wet, dense
			0.1 @ 23.5		(no odor)
			0.1 @ 24.0		
			NM @ 24.5		
(see next page)					

ARCADIS

Sample/Core Log (Cont.d)

Boring/Well: 1795-AS-10

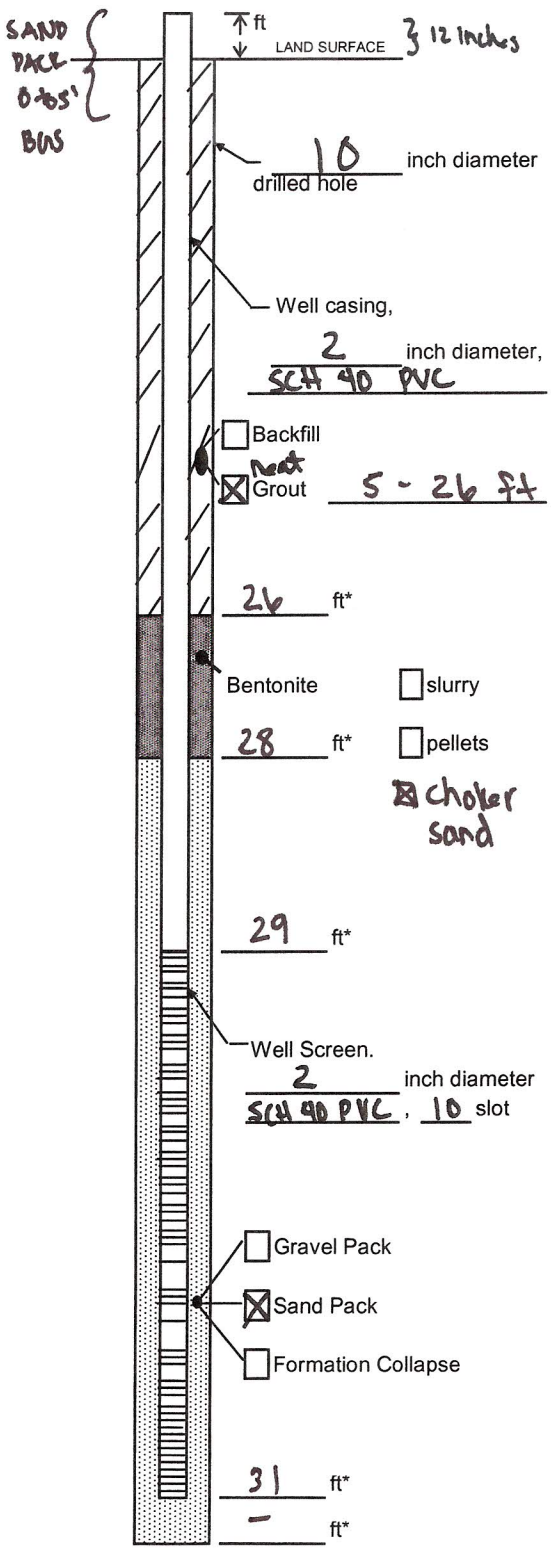
Prepared by: Meghan Kiser

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	PID Reading (ppm)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
25.0	27.0	1.5	0.2 @ 25.0	5-36-47-54	gray, fine sand, wet, dense
			0.1 @ 25.5		(no odor)
			0.1 @ 26.0		
			0.3 @ 26.5		
27.0	29.0	2.0	0.0 @ 27.0	21-48-50-52	SAA
			0.0 @ 27.5		
			0.0 @ 28.0		
			0.0 @ 28.5		
29.0	31.0	1.8	0.0 @ 29.0	21-37-42-70	SAA
			0.0 @ 29.5		
			0.0 @ 30.0		
			0.0 @ 30.5		
EOB @	31.0 ft	BGS			SCREEN @ 29.0 FT TO 31.0 FT BGS

ARCADIS

Well Construction Log

(Unconsolidated)



Measuring Point is Top of Well Casing Unless Otherwise Noted.

* Depth Below Land Surface

Project 1795 AS Wells Well 1795-AS-11

Town/City Watertown (Fort Drum)

County Jefferson State NY

Permit No. _____

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 11/04/15 and 11/05/15

Drilling Method 6 1/4" HSA

Drilling Contractor Nothnagle Drilling

Drilling Fluid Potable Water

Development Technique(s) and Date(s)

Air lifting 11/12/15

Fluid Loss During Drilling – gallons

Water Removed During Development ~27.50 gallons

Static Depth to Water 19.89 feet below M.P.

static depth to bottom 32.00 feet below MP

Pumping Depth to Water 20.41 feet below M.P.

Pumping Duration 21 ~~hours~~ minutes

Yield _____ gpm Date _____

Specific Capacity _____ gpm/ft

Well Purpose Air sparge

Remarks Final PTB: 32.00 ft BTOC

MP was with ~12 inches of PVC above grade

Prepared by Meghan Kiser

ARCADIS

Monitoring Well Development Log

Project/No. Fort Drum IRP 1795 AS Wells | Well 1795-AS-11 | Date 11/12/15

Total Depth 32.0 FT BTOC | Casing Diameter (inches) 2"

Water Level 18.89 FT BTOC | Well Volume (gal) 2.10 gallons

Water Column 13.11 ft | Total Volume Purged ~ 27.58 gallons

Pump On 0810 | Pump Off 0831

Purge Method
- Centrifugal ______
- Submersible ______
- (Other, circled) air lifting

Developed By Kevin Busch (Nothnagle)
Meghan Kerr (ARCADIS)

Well Casing Volumes

gallon/foot
1-¼" = 0.06 | 2" = 0.16 | 3" = 0.37 | 4" = 0.65
1-½" = 0.09 | 2-½" = 0.26 | 3-½" = 0.50 | 6" = 1.47

Time	Minutes Elapsed	Rate (gpm) (circled) (mL/min)	DTW (ft)	Gallons Purged	pH	Specific Conductance (mS/cm)	Temp. (C) (circled) (F)	Turbidity (NTU)	REMARKS (PID readings, color, odor, etc.)
0815	5	1.53	20.41	7.65	7.52	3.16	11.02	40.2	—
0820	10	1.53	20.31	15.30	7.53	3.13	11.00	19.2	—
0825	15	1.36	20.24	22.10	7.57	3.17	11.02	18.9	petroleum-like odor
0830	20	1.02	20.25	27.20	7.63	3.15	11.04	18.1	petroleum-like odor
More than 10 well volumes purged, turbidity less than 50 NTU									
Final DTB	32.00	ft BTOC							
Final DTW	18.99	ft BTOC							

ARCADIS

Sample/Core Log

Boring/Well 1795-AS-11 Project/No. GP14PRUM.RCSC.H1795 Page 1 of 2

Site Location Fort Drum, NY

Drilling Started 11/04/05 Drilling Completed 11/05/05

Total Depth Drilled 31 Feet Hole Diameter 10 inches Type of Sample/ Coring Device 2" SS x 2'

Length and Diameter of Coring Device

Sampling Interval 19 - 31 feet

Land-Surface Elev. feet ☐ Surveyed ☐ Estimated Datum

Drilling Fluid Used Potable water Drilling Method 6 1/4" HSA

Drilling Contractor Nothnagle Driller Kevin Busch Helper Kyle Ryan

Prepared By Meghan Kiser Hammer Weight 140 Hammer Drop 30 ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	PID Reading (ppm)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
0.0	5.0	NA	NH	NA	hand cleared 0.0 to 5.0 ft
B D					
L R					
I I					
N L					
D L					
19.0	21.0	1.4	2.3 @ 19.0	6-12-13-12	gray-brown, fine sand, wet, dense
			3.7 @ 19.5		(slight odor)
			4.7 @ 20.0		
			NH @ 20.5		no recovery no PID reading
21.0	23.0	2.0	0.3 @ 21.0	4-11-13-17	SAA
			0.2 @ 21.5		
			0.4 @ 22.0		
			0.2 @ 22.5		
23.0	25.0	1.2	0.7 @ 23.0	5-5-12-15	SAA
			0.9 @ 23.5		
			0.8 @ 24.0		
			NH @ 24.5		no recovery, no PID reading
(see next page)					

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Sample/Core Log (Cont.d)

Boring/Well 1795-AS-11

Page 2 of 2

Prepared by Meghan Kiser

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	PID Reading (ppm)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
25.0	27.0	1.6	0.0 @ 25.0	3-9-18-28	gray-brown, fine sand, wet, dense
			0.0 @ 25.5		(no odor)
			0.0 @ 26.0		
			0.0 @ 26.5		
27.0	29.0	1.9	0.0 @ 27.0	14-37-64-50	gray, fine sand, wet, dense
			0.0 @ 27.5		(no odor)
			0.0 @ 28.0		
			N.M @ 28.5		no recovery, no PID reading
29.0	31.0	2.0	0.0 @ 29.0	25-35-43-61	SAA
			0.0 @ 29.5		
			0.0 @ 30.0		
			0.0 @ 30.5		
EOB @	31.0 FT	BGS			Screen @ 29.0 TO 31.0 FT BGS

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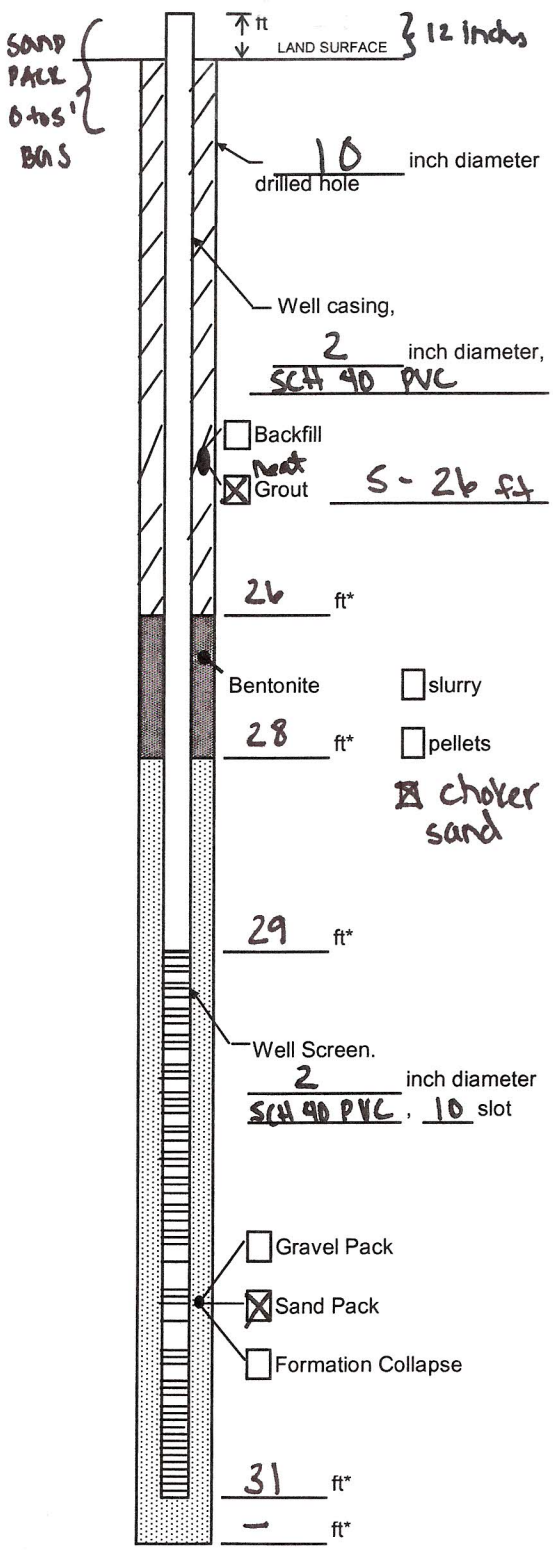
Well Construction Log

(Unconsolidated)



Measuring Point is Top of Well Casing Unless Otherwise Noted.

* Depth Below Land Surface

Project 1795 AS Wells Well 1795-AS-12

Town/City Watertown (Fort Drum)

County Jefferson State NY

Permit No. —

Land-Surface Elevation and Datum:

— feet ☐ Surveyed ☐ Estimated

Installation Date(s) 11/04/15

Drilling Method 6 1/4" HSA

Drilling Contractor Nothnagle Drilling

Drilling Fluid Potable Water

Development Technique(s) and Date(s)

Air lifting 11/12/15

Fluid Loss During Drilling — gallons

Water Removed During Development ~26.9 gallons

Static Depth to Water: 20.36 ft feet below M.P.

Static Depth to Bottom: 32.0 ft below M.P.

Pumping Depth to Water 21.31 feet below M.P.

Pumping Duration 27 ~~hours~~ minutes

Yield — gpm Date —

Specific Capacity — gpm/ft

Well Purpose Air sparge

Remarks Final PTB: 32.00 ft BTOC

MP was with PVC ~12 inches of PVC above grade

Prepared by Meghan Kiser

ARCADIS

Monitoring Well Development Log

Project/No. Fort Drum IRP PFAS AS Wells Well 1795-AS-12 Date 11/12/15

Total Depth 32.0 ft BTOC Casing Diameter (inches) 2"

Water Level 20.36 ft BTOC Well Volume (gal) 1.86 gallons

Water Column 11.64 ft Total Volume Purged ~26.9 gallons

Pump On 0725 Pump Off 0752

Purge Method: Centrifugal ____ Submersible ____ (Other) airlifting

Developed By Kevin Busch (Nothnagle) Meghan Kerr (ARCADIS)

Well Casing Volumes

gallon/foot				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

Time	Minutes Elapsed	Rate (gpm) (mL/min)	DTW (ft)	Gallons Purged	pH	Specific Conductance (mS/cm)	Temp. (C) (F)	Turbidity (NTU)	REMARKS (PID readings, color, odor, etc.)
0730	5	1.36	21.31	6.8	7.67	2.24	12.04	157	
0740	15	0.85	21.67	15.3	7.62	2.19	11.63	44.0	petroleum-like odor
0745	20	1.19	21.67	21.25	7.61	2.16	11.45	20.2	petroleum-like odor
0750	25	1.02	21.67	26.35	7.62	2.13	11.29	16.1	
More than	10	well	volume	removed,	turbidity	less than	50	NTU	
Final DTB:	32.00	ft BTOC							
Final DTW:	20.31	ft BTOC							

ARCADIS

Sample/Core Log

Boring/Well 1795-AS-12 Project/No. GPI4DRUM, RCSC, #1795 Page 1 of 2

Site Location Fort Drum, NY

Drilling Started 11/04/15 Drilling Completed 11/04/15

Total Depth Drilled 31 Feet Hole Diameter 10 inches Type of Sample/ Coring Device 2" SS x 2'

Length and Diameter of Coring Device

Sampling Interval 19 - 31 feet

Land-Surface Elev. feet ☐ Surveyed ☐ Estimated Datum

Drilling Fluid Used Potable Water Drilling Method 6 1/4" HSA

Drilling Contractor Nothnagle Driller Kevin Busch Helper Kyle Ryan

Prepared By Meghan Kiser Hammer Weight 140 Hammer Drop 30 ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	PID Reading (ppm)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
0.0	5.0	NA	NM	NA	HAND CLEARED 0.0 TO 5.0 FT
B D					
L R					
I I					
N L					
D L					
19.0	21.0	1.7	0.0 @ 19.0	7-14-15-21	gray-brown, fine sand, wet, dense
			0.0 @ 19.5		(no odor)
			0.0 @ 20.0		
			0.0 @ 20.5		
21.0	23.0	1.6	0.0 @ 21.0	5-12-15-21	SAA
			0.0 @ 21.5		
			0.0 @ 22.0		
			0.0 @ 22.5		
23.0	25.0	1.4	0.0 @ 23.0	6-12-17-22	gray-brown, very fine sand, wet, dense
			0.0 @ 23.5		(no odor)
			0.0 @ 24.0		
			NM @ 29.5		NO Recovery NO PID Reading
(see next page)					

ARCADIS

Sample/Core Log (Cont.d)

Boring/Well: 1795-AS-12

Prepared by: Meghan Kiser

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	PID Reading (ppm)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
25.0	27.0	1.3	0.0 @ 25.0	4-11-17-24	gray, very fine sand, wet, dense
			0.0 @ 25.5		(no odors)
			0.0 @ 26.0		
			NM @ 26.5		No recovery, no PID reading
27.0	29.0	1.7	0.0 @ 27.0	7-18-30-34	SAA
			0.0 @ 27.5		
			0.0 @ 28.0		
			0.0 @ 28.5		
29.0	31.0	1.8	0.6 @ 29.0	10-21-31-38	SAA
			0.7 @ 29.5		
			0.4 @ 30.0		
			0.2 @ 30.5		
EOB @	31.0 ft	BGS			screen @ 29.0 TO 31.0 FT BGS